



Apple Service  
Technical Procedures  
Cross Family Peripherals  
Volume Three



# **Apple Service Technical Procedures Cross Family Peripherals**

## **Volume Three**

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(Cross Family Not Sold Separately)



🍏 Apple Technical Procedures

# Cross Family Peripherals

## Volume Three

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# Apple Technical Procedures

## ImageWriter LQ

### Technical Procedures

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# ImageWriter LQ

## Section 1 – Basics

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## □ INTRODUCTION

### Features

The Apple ImageWriter LQ is a wide-carriage dot matrix impact printer. The following list details its features.

#### Multiple Fonts

- Five built-in fonts
- Times, Helvetica, Courier, and Symbol font families provided on disk for the Macintosh

#### Printing Speeds

- Draft (fixed width) - 250 characters per second maximum
- Near Letter Quality - 145 characters per second maximum
- Letter Quality - 115 characters per second maximum

#### Paper Handling

- Push or pull tractor for pin-feed paper
- Pull tractor for labels, heavy stock, and multipart forms
- Paper switching—from pin-feed to single sheet—without unloading
- Automatic paper loading and paper backout

#### Color Capability

- Provides seven-color printing with a four-color ribbon

#### Options

- Cut Sheet Feeder - Available with one, two, or three-bins plus an envelope feeder
- ImageWriter II/LQ AppleTalk Option - Allows the ImageWriter LQ to be used on the AppleTalk network

## Self-Identification

- The printer automatically determines its operational mode by checking to see if there is a color ribbon, a sheet feeder, or an option card installed

## Interface

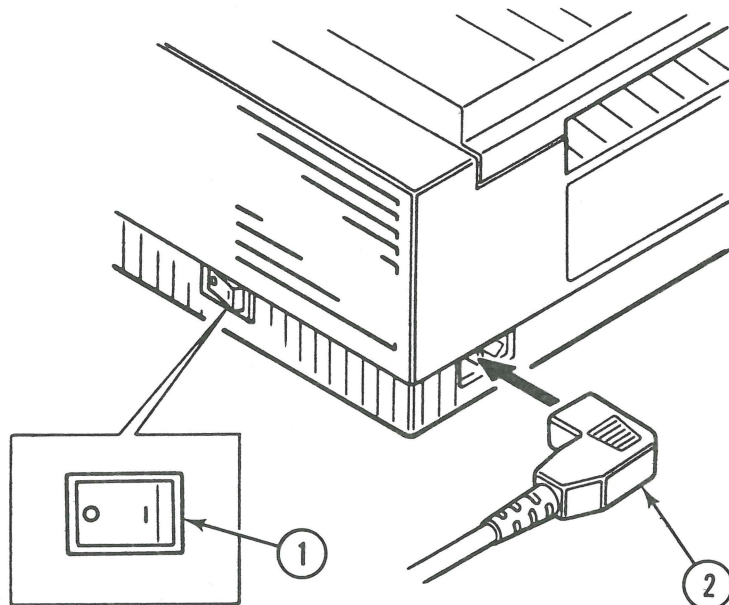
- RS 422/423
- 7 or 8 data bits
- DTR hardware or XON/XOFF software handshaking

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## □ SETUP

### Power On and Off

1. Make sure the printer is turned off (Figure 1, #1).



**FIGURE 1**

2. Connect the power cord to the printer (Figure 1, #2).
3. Plug the power cord into an electrical outlet.



4. Turn on the printer.
5. Check the control panel. Make sure the green Power and Print Quality lights come on.

**Note:** The red Error indicator light will also come on because no paper has been loaded yet.

6. Turn off the printer.

## Load and Remove Paper

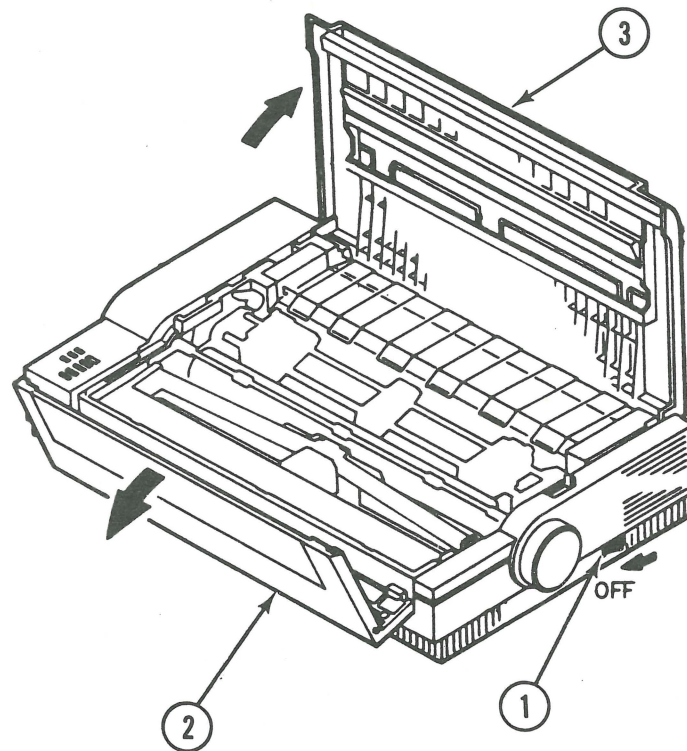
Paper can be loaded into the ImageWriter LQ using one of five methods. Table 1 lists each of the five methods. Two of the five methods—single sheet and push tractor—will be briefly covered here. Refer to the *ImageWriter LQ Owner's Guide* for detailed procedures on how to use each paper-loading method.

ImageWriter LQ Paper Feeder Options			
Method	Paper	Feed In	Feed Out
Push Tractor	Pin Feed Regular	Rear	Top Slot
Pull Tractor	Pin Feed Regular	Bottom	Rear
Pull Tractor	Pin Feed Regular	Rear	Rear
Pull Tractor	Pin Feed Forms/Labels	Bottom	Rear
Single Sheet	Single Sheet	Behind Platen	Top Slot

**TABLE 1**

*Tractor  
Position*

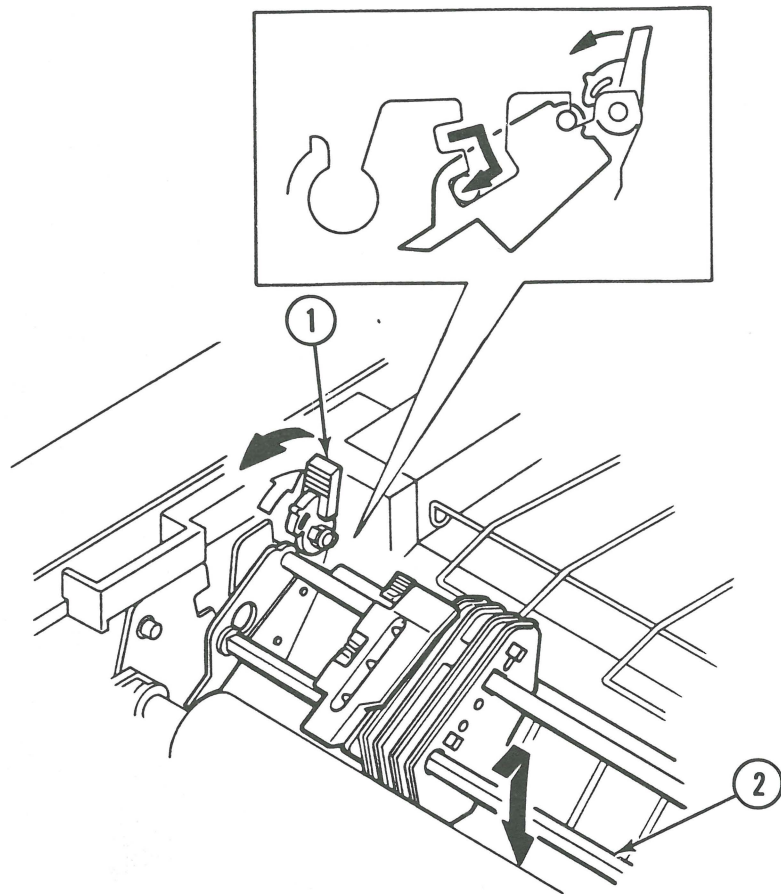
The single-sheet and push tractor methods of loading paper both require that the tractor block be placed in the "push" position. If the tractor is not in the "push" position, perform the following procedure.



**FIGURE 2**

1. Turn off the printer (Figure 2, #1).
2. Open the front cover (Figure 2, #2) and then the rear cover (Figure 2, #3).



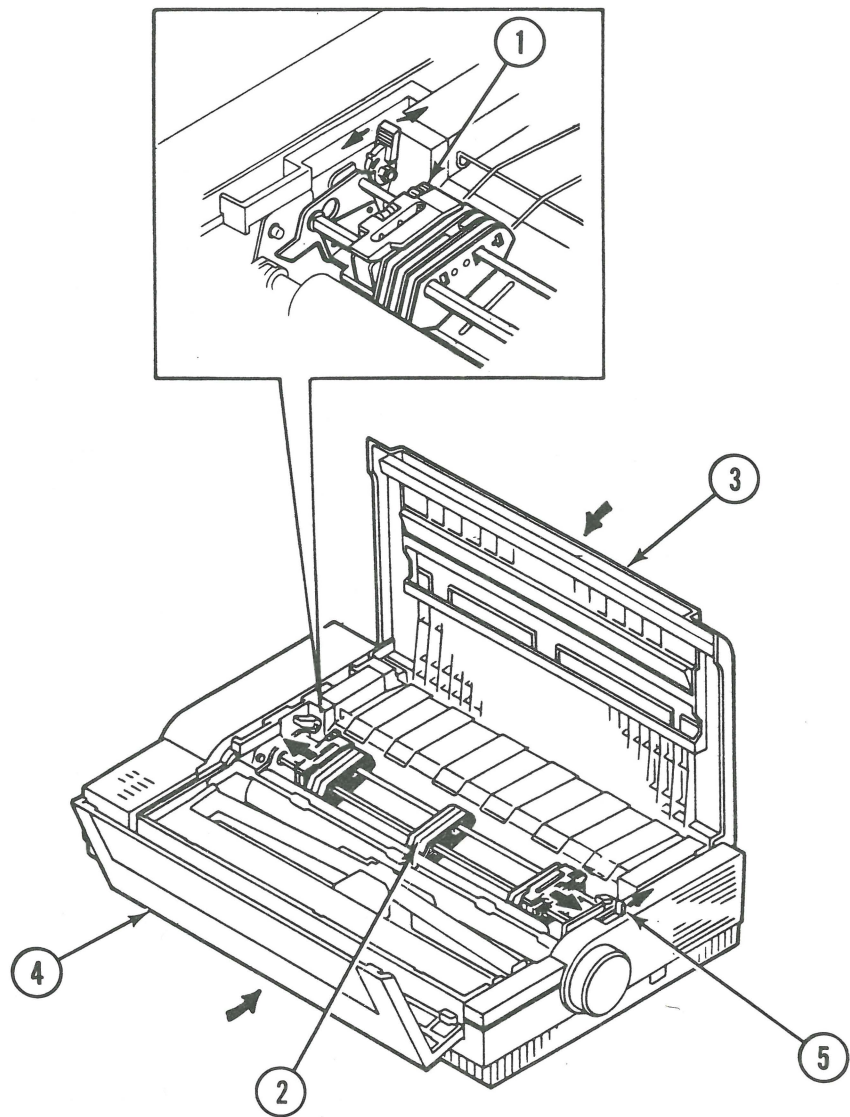


**FIGURE 3**

3. Set the tractor block to the "push" position as follows:
  - a) Push both the right (Figure 3, #1) and left blue tractor levers toward the back of the printer to release the tractor.
  - b) With your thumbs on the middle of the tractor shaft (Figure 3, #2), lift up slightly, then push down and toward the rear of the printer until the tractor block locks in place.
  - c) Pull both the right and left blue tractor levers forward and then push them down to lock.

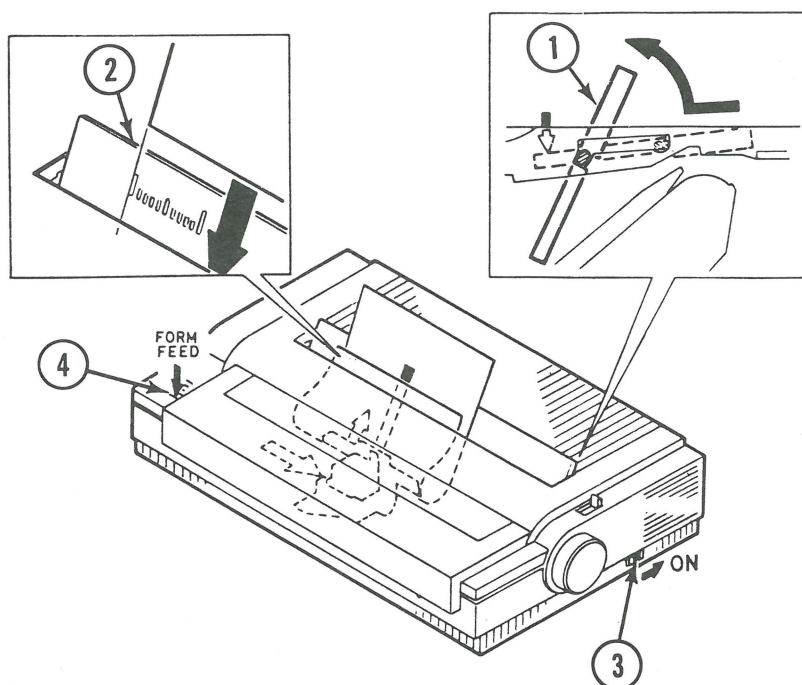
*Friction Feed  
Paper Loading*

1. If you have not already done so, set the tractor block to the "push" position.



**FIGURE 4**

2. Push the left (Figure 4, #1) and right tractor release levers toward the back of the printer.
3. Move the left tractor to the extreme left side of the printer and then move the right tractor to the extreme right side of the printer.
4. Lock the tractors in place by pulling the tractor release levers forward and then down.
5. Move the paper guide (Figure 4, #2) until it is approximately one third of the way from the left side of the printer.
6. Close the rear cover (Figure 4, #3) and then the front cover (Figure 4, #4).
7. Push the friction release lever (Figure 4, #5) toward the back of the printer to the friction feed position.



**FIGURE 5**

8. Lift up and pull forward on the cut sheet guide (Figure 5, #1) until it stops.
9. Insert a sheet of paper into the printer (Figure 5, #2) in front of the cut sheet guide, aligning it with the mark on the cut sheet guide. Slide the paper into the printer until it stops.
10. Turn on the printer (Figure 5, #3).
11. Press the form feed button on the printer control panel (Figure 5, #4). The printer will automatically load the paper to the print start position.

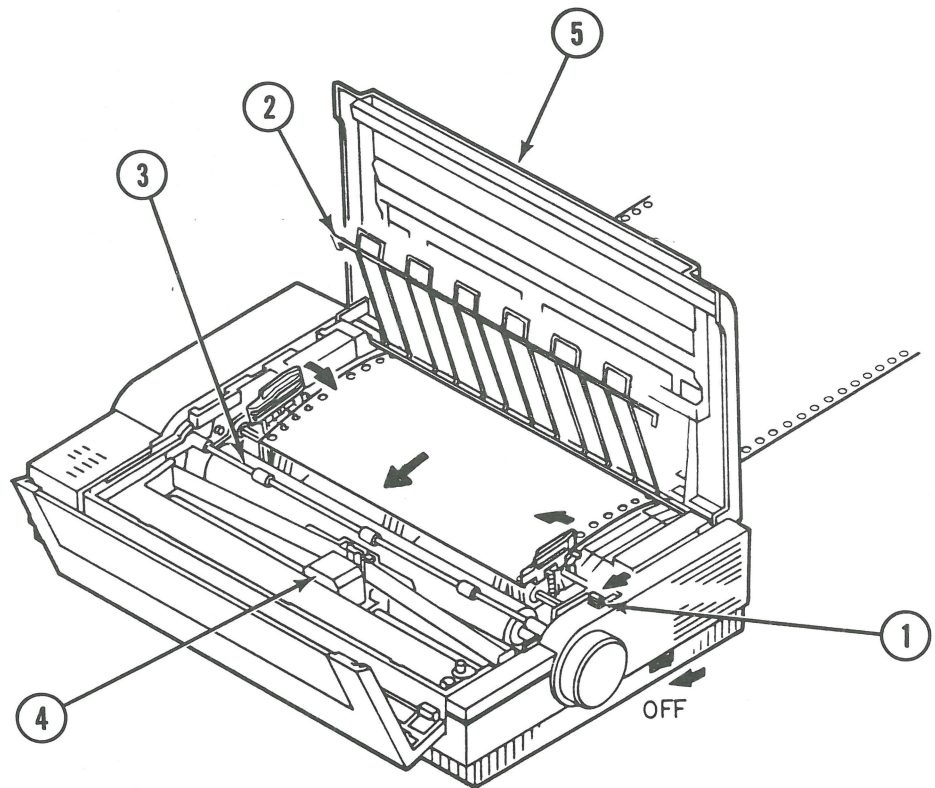
*Friction Feed  
Paper Removal*

1. Turn on the printer
2. Press the select button. The select button indicator light will turn off.
3. Press the form feed button to remove the sheet of paper.



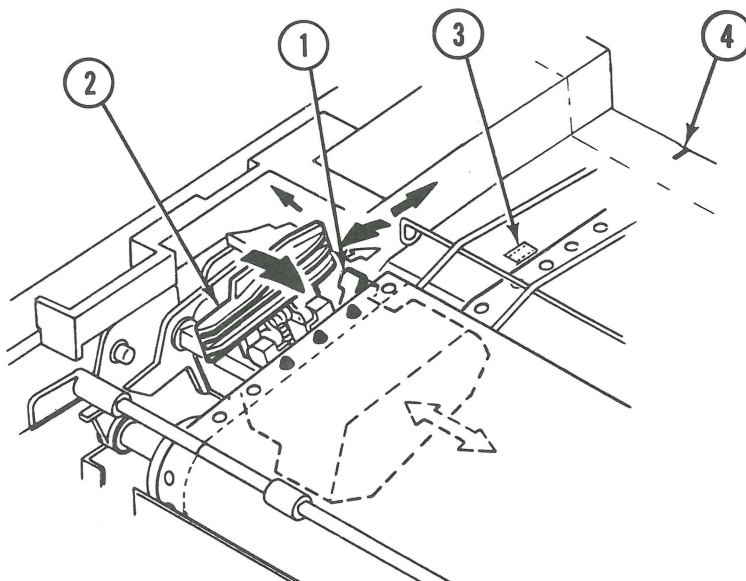
*Push Tractor  
Paper Loading*

1. If you have not already done so, set the tractor block to the "push" position.



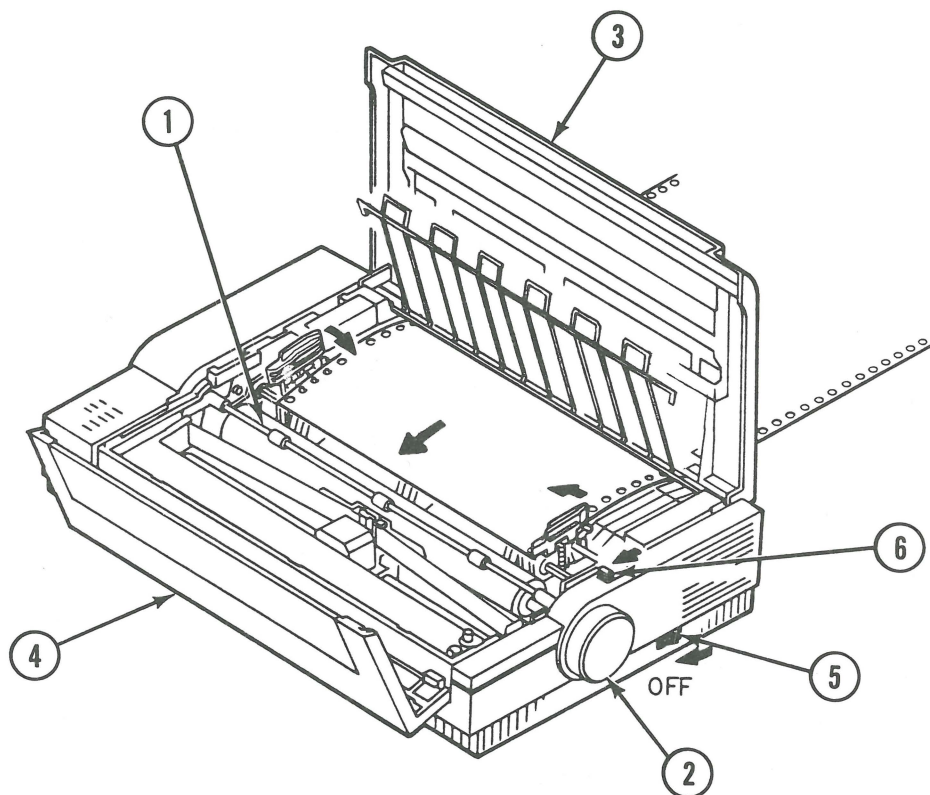
**FIGURE 6**

2. Pull the paper-feed lever (Figure 6, #1) toward the front of the printer, to the tractor feed position, until it stops.
3. If present, remove the paper separator (Figure 6, #2).
4. Pull the paper bail forward (Figure 6, #3).
5. Slide, by hand, the carrier assembly (Figure 6, #4) to the center of the platen.
6. Insert the pin feed paper into the paper slot at the back of the printer (Figure 6, #5).



**FIGURE 7**

7. Load the paper onto the tractor pins (see Figure 7).
  - a) Push both the right and left blue tractor levers (Figure 7, #1) toward the back of the printer to release the tractors.
  - b) Pull open the left (Figure 7, #2) and right paper clamps.
  - c) Place the lead sheet of paper so that the top three pins of the left tractor poke through the first three pin holes. Close the left paper clamp.
  - d) Locate the pin-feed alignment icon (Figure 7, #3) toward the rear of the printer case, and the pin-feed alignment notch (Figure 7, #4) at the back edge of the printer. Slide the left tractor until the paper edge aligns with the icon groove and the notch.
  - e) Pull the left blue tractor lever toward the front of the printer to lock the tractor in place.
  - f) Place the paper on the first three pins of the right tractor, and close the right paper clamp.
  - g) Move the right tractor away from the left tractor until the paper lies flat, with no wrinkles. Pull the right blue tractor lever toward the front of the printer to lock the tractor in place.



**FIGURE 8**

8. Rotate the platen knob (Figure 8, #2) until the next sheet of the fan-fold paper is in the print position.
9. Push the paper bail (Figure 8, #1) toward the back of the printer until it rests on the paper.
10. Close the rear cover (Figure 8, #3) and then the front cover (Figure 8, #4).

*Push Tractor  
Paper Removal*

1. Make sure the printer is turned off (Figure 8, #5).
2. Check to be sure that the friction release lever (Figure 8, #6) is set to "tractor feed."
3. Turn the platen knob (Figure 8, #2) to back out the paper.

## Install the Ribbon Cartridge

1. Turn on the printer and let it cycle through the print-head movement.
2. Turn off the printer.

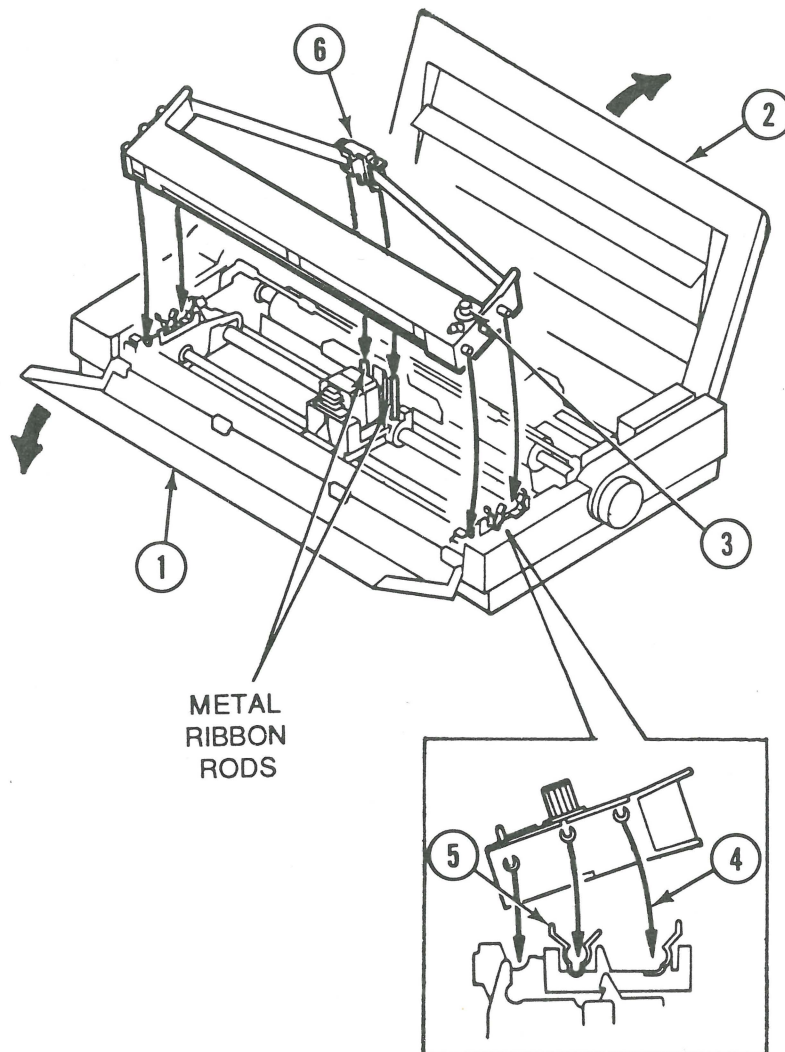


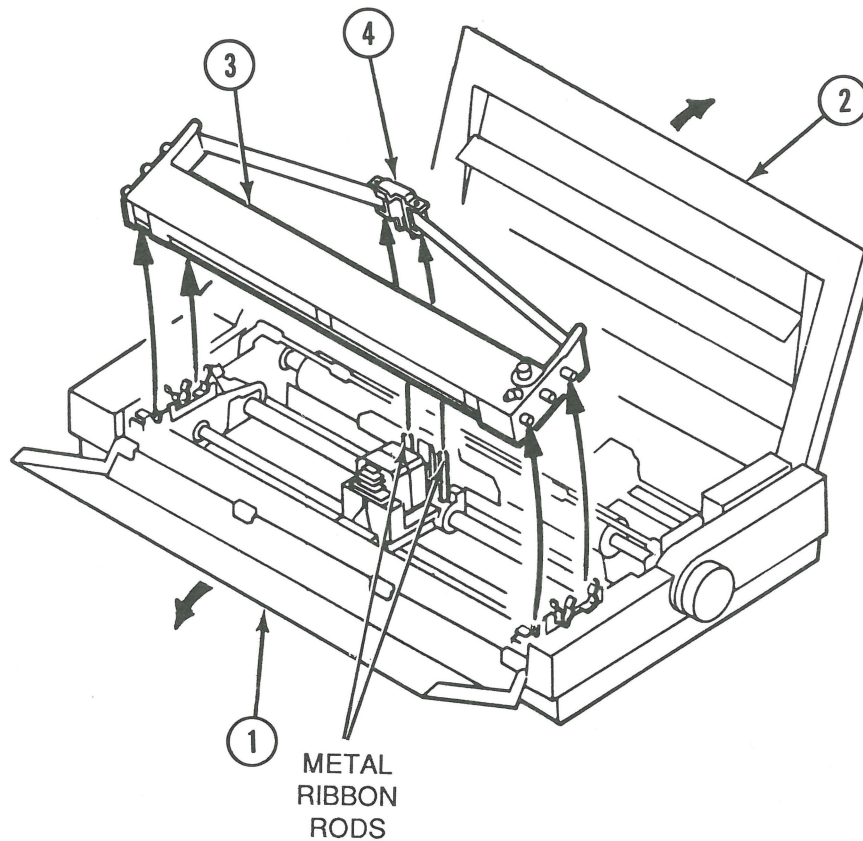
FIGURE 9



3. Open the back cover (Figure 9, #2) and then the front cover (Figure 9, #1) of the printer.
4. Locate the ribbon knob on top of the ribbon cartridge (Figure 9, #3).
5. Holding the ribbon cartridge top side up, lower it into position in the printer (Figure 9, #4).
6. Gently press on the cartridge so that the tabs on both ends (Figure 9, #5) snap into place.
7. Slide the two plastic tubes of the ribbon clip-in guide onto the metal rods (Figure 9, #6). Gently press down on the clip-in guide until it snaps into place.
8. Turn the ribbon knob on top of the cartridge to the right (clockwise) to remove any slack in the ribbon (Figure 9, #3).
9. Close the front cover and then the rear cover.

## Remove the Ribbon Cartridge

1. Make sure the printer is turned off.



**FIGURE 10**

2. Open the back cover (Figure 10, #2) and then the front cover (Figure 10, #1) of the printer.
3. Gently lift up one end of the ribbon cartridge and then the other until it unsnaps from the printer (Figure 10, #3).
4. Gently pull up on the ribbon clip-in guide (Figure 10, #4) until it is free from the metal rods.
5. Follow the instructions in "Install the Ribbon Cartridge" to install a new ribbon.

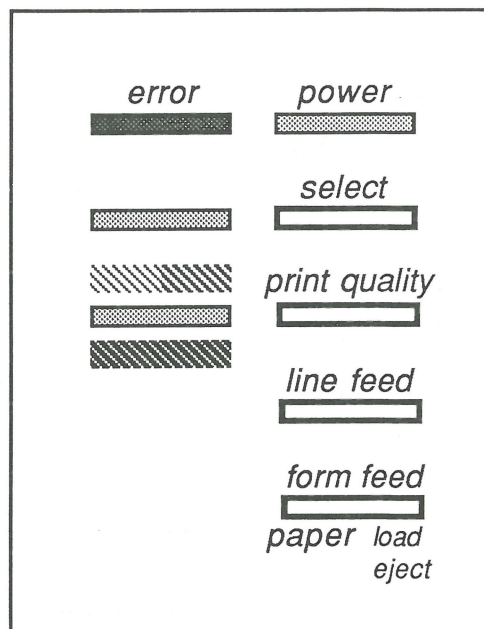
## Software, Cables, and Switches

Refer to the *ImageWriter IQ Owner's Guide* for detailed directions on installing software and cables and setting peripheral switches.

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## ❑ CONTROL PANEL

The Control panel contains four buttons and four indicator lights (see Figure 11).



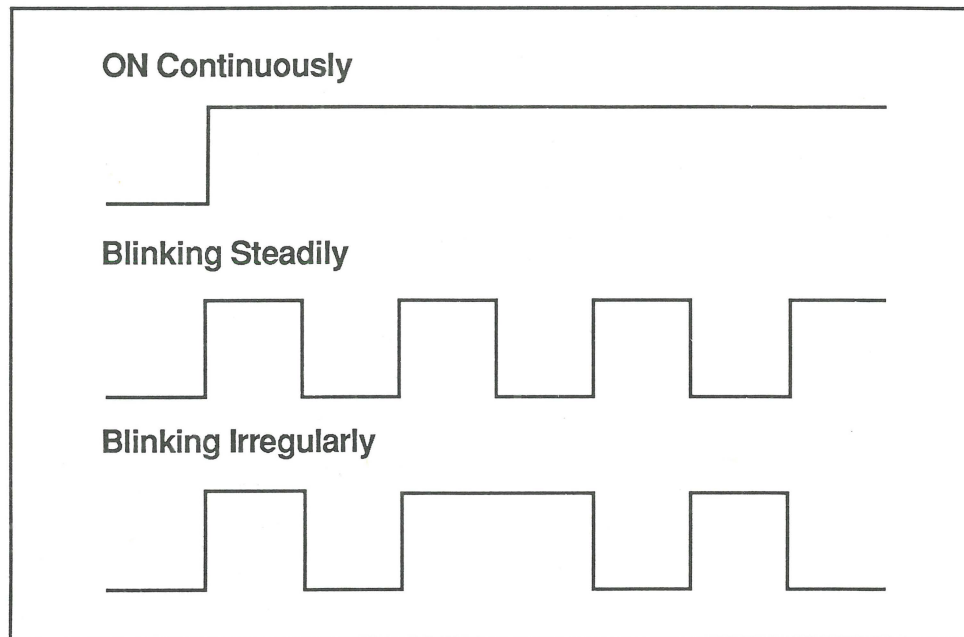
**FIGURE 11**

### **Power Indicator Light**

The power indicator light comes on when you turn on the printer and stays on until you turn off the printer.

## Error Indicator Light

Errors are indicated by the error indicator light (red light) lighting up three different ways: on continuously, blinking steadily, and blinking irregularly (see Figure 12).



**FIGURE 12**

### **On continuously**

- The printer has run out of paper. Load the appropriate paper and press the select button to continue.
- Dark paper has been loaded, or a form with a black band on the back left side has been loaded. In both cases, the paper-out sensor interprets this as if no paper is loaded. Simply press the select button to continue printing.



### **Blinking steadily**

- The front cover of the printer is not completely closed. Close the front cover and press the select button.
- The print mechanism may be jammed. Eliminate the jam and press the select button to continue.

### **Blinking irregularly**

- DIP switch 2-4 is incorrectly set. It must be set in the open (back) position if the AppleTalk card is not installed and in the closed position if the card is installed. Turn the printer off, correct the switch setting, and then turn the printer on again.

### **Select Button and Indicator Light**

Pressing the select button changes the printer's status from on-line to off-line or vice-versa. The select button should also be pressed to clear an error condition (and turn the error light off) after you have corrected the problem.

Place the printer on-line to

- Print
- Clear the error light after you have corrected the problem

Place the printer off-line to

- Change print quality
- Issue a line feed
- Issue a form feed
- Temporarily stop printing in the middle of a document

## **Print Quality Button and Indicator Light**

The print quality button lets you select three different levels of print quality—Draft Quality, Near Letter Quality, and Letter Quality—for Apple II computers. (However, note that software menu selections almost always override a print quality button selection.)

Be sure the select button indicator light is off before pressing the print quality button. Press the print quality button one, two, or three times to select the desired quality of print.

### **Draft Quality**

- High-speed printing at 250 characters per second.
- The left half of the print quality indicator light becomes lit.

### **Near Letter Quality**

- Higher quality printing at 90 characters per second.
- The right half of the print quality indicator light becomes lit.

### **Letter Quality**

- Highest quality printing at 45 characters per second.
- Both sides of the print quality indicator light become lit.

### **Line Feed Button**

The line feed button is used to advance paper one line at a time. Be sure that the select button indicator light is off before pressing the line feed button.

- Press the line feed button once to advance the paper one line.
- Hold down the line feed button to perform repeated (up to four) line feeds with a pause between each followed by a form feed. After five linefeeds, the printer automatically performs a form feed.

### **Form Feed Button**

The form feed button is used to advance a whole sheet of paper. Be sure that the select button indicator light is off before pressing the form feed button.

Use the form feed button to

- Advance a whole sheet of paper
- Load and position paper. Insert the paper so its top edge rests against the platen. Press the form feed button and the printer will automatically load and position the paper on the first print line
- Eject paper. Press the form feed button to eject a sheet of paper when the printing finishes midpage.
- Back out pin-feed paper. With the select button indicator light on, press both the form feed and select buttons at the same time to back out pin-feed paper to the normal loading position. With the pin-feed paper backed out, you can print on a single sheet of paper without having to completely remove the pin-feed paper.

---

## □ OPTIONS

Two options are available for the ImageWriter LQ: the AppleTalk card and a cut sheet feeder.

### **AppleTalk Card**

The ImageWriter II/LQ AppleTalk card makes it possible for one ImageWriter LQ to serve as many as 31 computers on an AppleTalk network. With the ImageWriter II/LQ AppleTalk card, your printer can receive data from an AppleTalk Personal Network instead of from a single, directly attached computer.

Refer to the *ImageWriter LQ Owner's Guide* for directions on how to install the AppleTalk card.

### **Cut Sheet Feeder**

The ImageWriter LQ Cut Sheet Feeder provides for automatic feeding of letterhead, stationery, and envelopes. You can use the Cut Sheet Feeder with one, two, or three bin attachments and the envelope attachment. Each sheet is fed as it is needed. Printed material is automatically collated and stacked.

Refer to the *ImageWriter LQ Owner's Guide* for directions on how to install the Cut Sheet Feeder.



## □ CONFIGURATION DIP SWITCHES

The ImageWriter LQ has three 8-pole DIP switches (see Figure 13, #1). The DIP switches are used to set printing parameters. Tables 2 through 13 indicate the functions and settings of the switches. Factory settings are indicated in bold. Turn off the printer (see Figure 13, #2) before resetting the DIP switches.

Baud rate and character pitch for the Apple II can only be set through use of the DIP switches. All other configuration settings are overridden by software menu selections.

**Note:** DIP switches 3-1 and 3-2 are not used.

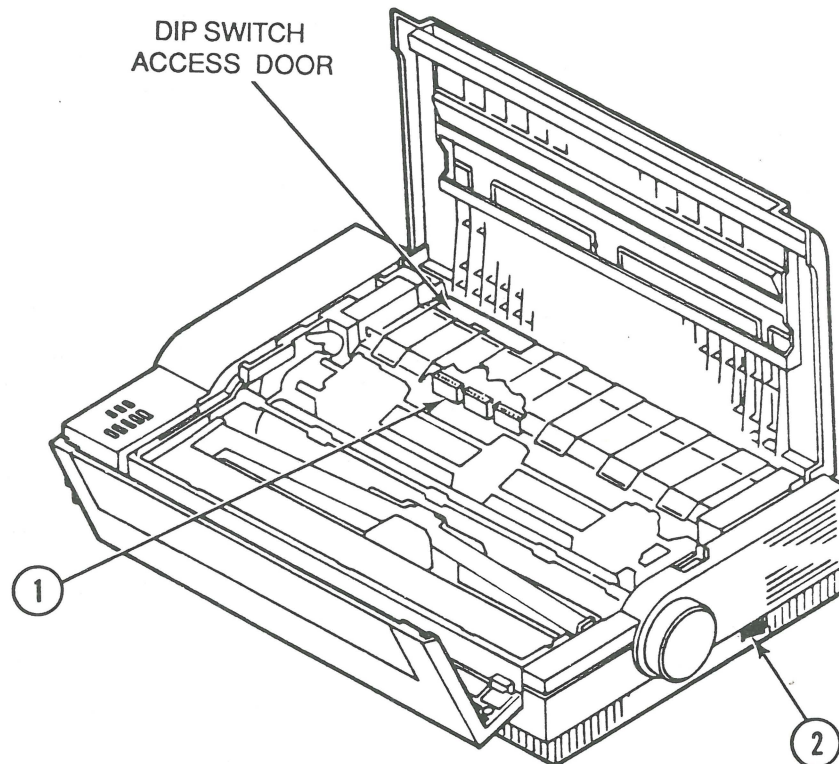


FIGURE 13

**International  
Character Sets**

Eight international character sets are available. Change the international character set by selecting the appropriate DIP switch setting from Table 2.

International Character Sets			
	SW1-1	SW1-2	SW1-3
American	OFF	OFF	OFF
Italian	ON	OFF	OFF
Danish	OFF	ON	OFF
British	ON	ON	OFF
German	OFF	OFF	ON
Swedish	ON	OFF	ON
French	OFF	ON	ON
Spanish	ON	ON	ON

**TABLE 2**

**Form Length**

This switch selects the form length of continuous-form paper (see Table 3).

Form Length	
	SW1-4
11 Inches	OFF
12 Inches	ON

**TABLE 3**

## Perforation Skip

This switch is used to skip the perforation of continuous-form paper. When this switch is set to ON, the printer skips 0.5 inch above and below the perforation (see Table 4).

**CAUTION:** This switch must always be set to ON.

Perforation Skip	
	SW1-5
Disabled	OFF
Enabled	ON

TABLE 4

## Initial Character Pitch

This switch sets the initial character pitch (see Table 5).

Characters/Dots Per Inch		
	SW1-6	SW1-7
10 cpi	OFF	OFF
12 cpi	ON	OFF
17 cpi	OFF	ON
160 dpi	ON	ON
216 dpi	ON	ON

TABLE 5

## Carrier Return Function

This switch sets the carriage to return-only or to return-and-perform-a-line-feed (see Table 6).

Auto LF on CR	
	SW1-8
Disabled	OFF
Enabled	ON

TABLE 6

**Asynchronous  
Baud Rate**

This switch sets the baud rate to one of four rates (see Table 7).

Baud Rate		
	SW2-1	SW2-2
1200	ON	OFF
2400	OFF	ON
9600	ON	ON
19200	OFF	OFF

**TABLE 7**

**Asynchronous  
Protocol**

This switch selects the asynchronous protocol (see Table 8).

Handshaking	
	SW2-3
Hardware (DTR)	OFF
X-On/X-Off	ON

**TABLE 8**

**Option  
Board**

This switch selects the installed option card (see Table 9).

Option Card	
	SW2-4
Not installed	OFF
Installed	ON

**TABLE 9**

## Cut-Sheet Feeder

This switch selects the number of bins attached to the Cut-Sheet Feeder (see Table 10).

Cut-Sheet & Envelope Feeder Bins			
	SW2-5	SW2-6	SW2-7
Bin 1	OFF	OFF	ON
Bins 1 and 2	ON	OFF	ON
Bins 1, 2, and 3	OFF	ON	ON
<b>Bin 1 and envelope</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>
Bins 1, 2, and envelope	ON	OFF	OFF
Bins 1, 2, 3, and envelope	ON	ON	OFF

TABLE 10

## Auto Paper Load Position

This switch sets where the paper will be positioned for printing (see Table 11).

Auto-Paper Load Position	
	SW2-8
To print line	OFF
To paper bail	ON

TABLE 11



## Color Ribbon Home Position

This switch sets the home position of the color ribbon (see Table 12).

Color Ribbon Home Position			
	SW3-3	SW3-4	SW3-5
<b>Shift Ribbon Down</b>			
.78125 mm	ON	ON	OFF
.46875 mm	OFF	ON	OFF
.15625 mm	ON	OFF	OFF
<b>Shift Ribbon Up</b>			
.78125 mm	ON	ON	ON
.46875 mm	OFF	ON	ON
.15625 mm	ON	OFF	ON

**TABLE 12**

**Note:** DIP switch 3 should only be set by a technician and never by the user. Switches 3-1 and 3-2 are not used.

## Character Alignment Adjustment

These switches adjust the horizontal alignment for bidirectional printing (see Table 13).

Horizontal Registration			
	SW3-6	SW3-7	SW3-8
<b>Left Movement</b>			
+0.159 mm	ON	ON	OFF
+0.106 mm	OFF	ON	OFF
+0.053 mm	ON	OFF	OFF
+0.000 mm	OFF	OFF	OFF
<b>Right Movement</b>			
-0.044 mm	ON	ON	OFF
-0.088 mm	OFF	ON	OFF
-0.132 mm	ON	OFF	OFF
-0.176 mm	OFF	OFF	OFF

**TABLE 13**

---

## □ THEORY OF OPERATION

### Overview

When reading over this theory, use the block diagram, Figure 14 on page 35, for reference.

When the power is turned on, the printer performs several functions. The reset circuit keeps the printer's CPU and gate arrays in a reset state until the logic power supply reaches the correct voltage levels. Once the correct voltage is reached, the reset state is released and the CPU can then begin executing the instructions in ROM. Signals are sent out through the gate arrays, IC8 and IC19, to start the carrier assembly, which moves the print head all the way to the left until the home position switch is contacted. The switch response is sent back to the CPU via the gate arrays; the print head is moved to the middle position of the carrier and then moved back to the left home position.

During this positioning of the print head, the platen is also rotated forward and then in reverse, to check the paper feed motor and gear assembly. During this brief period, several other sensors are being monitored, including the paper-empty sensor, cut-sheet feeder switch, home position sensor, interface signals, and the DIP switches.

If all the information and tests come back to the CPU satisfactorily, the printer is put in a ready/wait state, and will stay that way waiting for a print signal or for some other external condition to happen (for example, when the select button, line feed, or paper feed is pushed, or the printer is turned off). This ready-state condition is conveyed to the host computer through IC 22, the interface driver IC.

When a print signal is received from the host computer, through IC 23, it is processed by the CPU; then the necessary information is sent back to the host computer to start sending data to the printer. The serial data is received through IC 23, the interface receiver, and is converted to parallel data in IC 21. The data is then stored temporarily in either the working RAM or the extra RAM, and from there it is processed by the CPU and sent to the gate arrays. Control signals are also sent through the gate arrays to move the carrier

assembly, control the paper feed, control the print head, and control the ribbon position (using the ribbon motor and position sensor). The data is sent in the form of print wire commands via the head drivers, and the information is printed.

During the printing, the CPU is continuously monitoring the various sensors and is processing more data received from the host computer. The CPU is also constantly sending back information that tells the host when to send more data or when to stop sending data.

When there is no more data available, the printing process is shut down and the printer returns to the ready/wait state.

The main logic board controls all the functions of the printer. However, the printer is an electromechanical device; failure of mechanical functions can be caused either by an actual failure of the mechanical piece or by the controlling signals. You must sometimes isolate the two functions (mechanical and electrical) to find a problem. But when trying to understand how the printer works, you must think of the two functions together.

Following this overview are additional explanations of the various circuits on the main board control and how the board operates the mechanical functions of the printer.

## **Power Supply**

The power supply provides the following voltages: +30 VDC, +25 VDC, +5 VDC, and -5 VDC. These voltages are used in the following manner in the printer:

- The +30 voltage is used for the auto-load solenoid, and the reset circuit.
- The +25 voltage is used to drive the circuits that operate the print head, ribbon motor, paper feed motor, and carrier motor.
- The +5 voltage is used for the logic circuits.
- The -5 voltage is used in the interface circuit.

## **Main Logic Board**

This section discusses the various circuits on the board and what their basic functions are.

### *Interface Circuit*

The interface circuit (consisting of ICs 21, 22, 23, and connectors CN14 and CN15 on the main logic board) controls the transmission of data and the control signals between the printer and the host computer.

### *CPU*

The CPU is an Intel 80186 microprocessor running with a 14 MHz clock. The processor controls all functions of the printer.

### *Memory*

The printer has 128K bytes of ROM (IC 20) that store the printer routine operations and character patterns.

The printer has 64K bytes of RAM (IC 10 and IC 11), which are used as the working area for data input/output and program information.

Another optional 64K bytes of RAM (ICs 9 and 12) can be allocated as data buffers for data that is received from the host.

### *Print Head Drive*

The print head drive circuit controls the print head pins that strike the ribbon and paper. The circuit is made up of the head drivers, ICs 1, 2, 3, 4, 5, 6, 7; the head signal control, IC 18; and connectors CN 3 and 4. The signals driving these drivers are coming from the gate arrays (IC 8 and IC 19). The pins are fired (according to the data received from the host computer) to form the characters and images on the printer paper.

### *Carrier Motor Drive*

The carrier motor drive circuit consists of IC 4 and connector CN 5. IC 4 receives the motor phase and speed control signals from gate array IC 8. The carrier speed is dependent on the print mode being used.

### *Paper Feed Motor Drive*

IC 16 and connector CN 6 are part of the paper feed drive circuit that activates the paper feed motor. The signals are processed by gate array IC 8. The paper feed motor is active during normal operation, during automatic paper treading, and when the line feed or sheet feed buttons are pressed.



### *Ribbon Motor Drive*

The ribbon motor drive circuit, composed of IC 17 and connector CN 7, controls the ribbon motor, which drives the color ribbon up and down, allowing the printer to print in 4 different colors.

### *Auto-Load Solenoid*

The auto-loading solenoid circuit uses IC 1 and transistor Q 6 to develop the drive signals to open or close the paper bail during automatic paper loading.

### **Mechanical Operation**

The gate arrays control the carrier movement, print head, and the color ribbon motor. The 27 pins on the print head are driven independently while the print head is in motion.

### *Carrier Drive*

The print head and carrier, attached to the timing belt, are moved by the stepping motor. The alignment of the print head to the platen is set by the two shafts on which the print head/carrier rides. The print head location is monitored on the left side of the carriage by the home position switch. The normal operation of the carriage is bidirectional (that is, printing can occur when the carriage is moving in either direction). In a heavy-duty cycle where the print wire solenoids get too hot, the carriage drive will revert to unidirectional (that is, printing in one direction only) to allow the print head time to cool off.

### *Ribbon Feed*

The ribbon cartridge is driven by the gear assembly, which is part of the carrier drive mechanism. The feed direction of the ribbon is left to right, and remains the same regardless of the print head direction.

### *Ribbon Shift*

The ribbon cartridge sits on the ribbon shift assembly, which consist of a stepper motor, idler gear, ribbon guide, and cam gear. The ribbon shift assembly moves the ribbon up and down. This movement is used for a color ribbon to print in different colors and for a black ribbon to print in different bands, resulting in an even use of the black ribbon.



## *Paper Feed*

The paper feed assembly consists of the paper feed motor, platen gear, tractor gear, CSF idler gear, idler gear, and shift gear. How these gears work together depends on how the paper is fed through the printer. There are three possible modes of operation: tractor feed *pull*, tractor feed *push*, and friction feed. A push/pull switch under the left side of the tractor is used for detecting the push/pull mode when the lever is set for tractor feed.

- Tractor feed pull – When you are using this mode, the paper feed gears work the following way: Looking at a left-side view of the gear assembly, the feed motor rotates in a clockwise motion and the platen gear turns counterclockwise. This motion turns the idler gear clockwise and makes the tractor gear turn counterclockwise. In this mode the paper holes are inserted on top of the sprocket. When the tractor gear turns, it moves the sprockets that pull the paper through the printing area.
- Tractor feed push – In this mode the motor gear, platen gear, and idler gear move in the same way as explained above; however, an additional gear is used. The shift gear is used between the idler gear and the tractor gear. The shift gear reverses the rotation of the tractor gear, so that it is rotating in a clockwise direction. This reverse rotation, along with how the paper is fed, (paper is fed through the back) allows the paper to be pushed between the platen and the print area.
- Friction feed – In this mode, a lever is shifted that moves the shift gear in such a way that the shift gear no longer meshes with the tractor gear, preventing the paper sprockets from moving. Consequently, the paper is fed down between the platen and the pinch rollers. The friction between these two surfaces causes the paper to move.

## *Paper Bail*

The paper bail is moved up by the auto-load solenoid during auto-loading (push mode) or single-sheet feeding. After one inch of printing has occurred, the solenoid is deactivated and the paper bail is moved downward onto the paper.

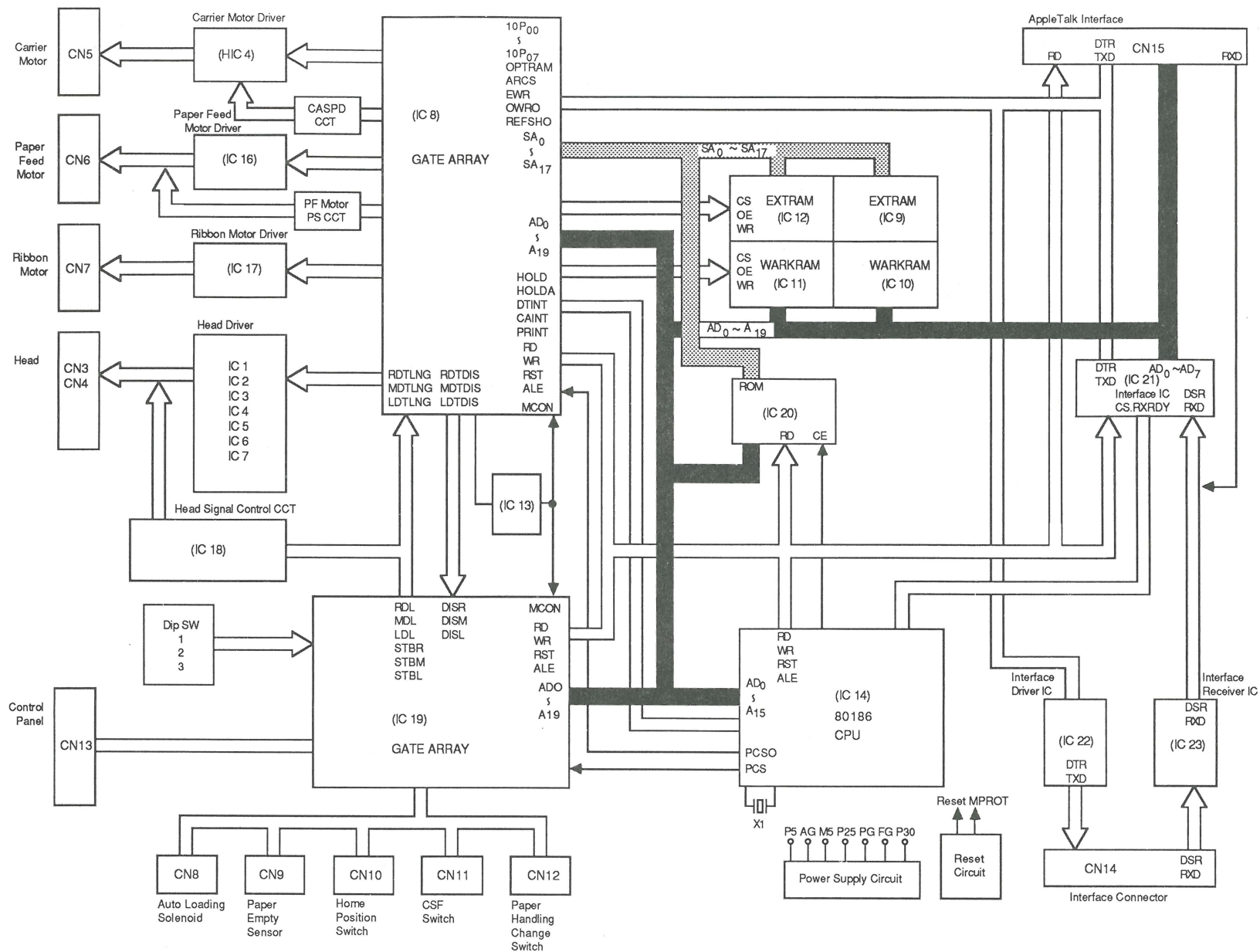
*Paper-Empty  
Detection*

There are two paper-empty sensors used in this printer. One is a photo coupler that is used for rear paper feed, and the other is a microswitch used for bottom paper feed. Both are located on the left side under the paper pan. If both switches detect the absence of paper, a paper-empty signal is sent to the CPU.

**Block  
Diagram**

Use Figure 14 (opposite) for reference when reading the preceding Theory of Operations section.

FIGURE 14



# ImageWriter LQ

## Section 2 – Take-Apart

---

### □ CONTENTS

2.3	Front Cover
2.5	Rear Cover
2.6	Main Cover
2.9	Control Panel PCA and Cable
2.10	Option Card Cable
2.11	Tractor Block
2.13	Right Tractor Assembly
2.14	Left Tractor Assembly
2.15	Card Guide
2.16	Print Head
2.18	Print Head to Relay PCB Cable
2.20	Platen Assembly
2.22	Pinch Roller Assembly
2.24	Paper-Out Sensor
2.27	Tractor Drive Gear
2.27	Cassette Latch
2.28	Main Board
2.31	Fuses
2.32	Power Supply Assembly
2.32	AC Power Switch
2.33	Transformer/Noise Filter PCA Assy Bracket
2.36	Transformer
2.37	Universal Transformer
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2.40	Home Position Switch
2.42	Cut Sheet Feeder Switch
2.44	Carrier Drive Motor
2.46	Auto-Load Solenoid
2.48	Mechanical Assembly
2.55	Paper-Detect Switch
2.56	Color Ribbon Motor Assembly
2.59	Paper Feed Motor
2.60	Gear Linkage Assembly
2.62	Option Card

**Note:** If a step is underlined, detailed instructions for that step can be found elsewhere in the section.

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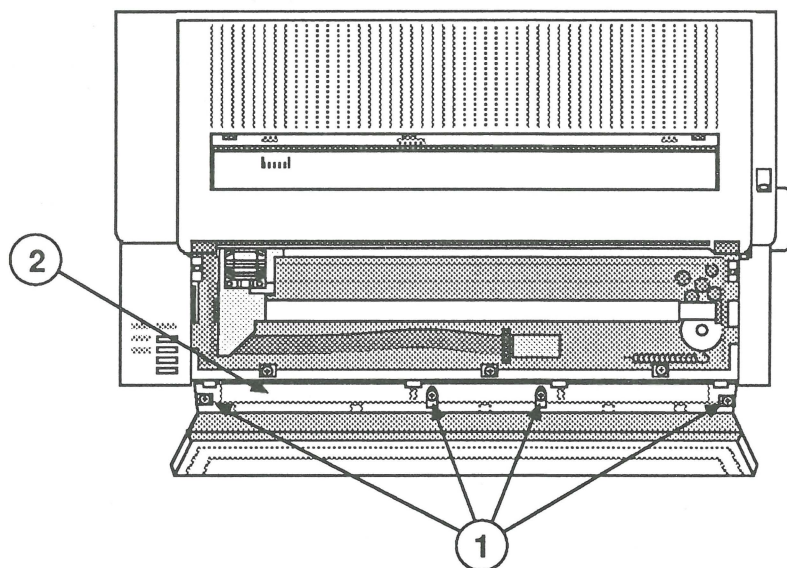
## □ FRONT COVER

### Materials Required

#2 Phillips screwdriver

### Remove

1. Open the front cover by grasping its sides and rotating it up and toward you.



**FIGURE 1**

2. Remove the four Phillips screws (Figure 1, #1) holding the front cover to the hinge plate (Figure 1, #2).
3. Pull the front cover toward you approximately 1/4 inch.

---

**CAUTION:** *The first time or two you remove the front cover, you may need to pull a little harder than normal. Be careful: you can damage the top cover or hinge plate if you pull too hard.*

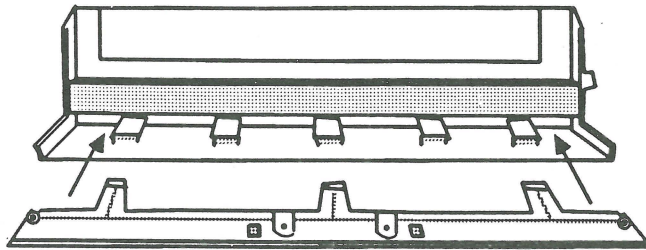
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4. Rotate the cover toward its closed position. When it is closed about half way, you will be able to unhook the front cover from the main cover.



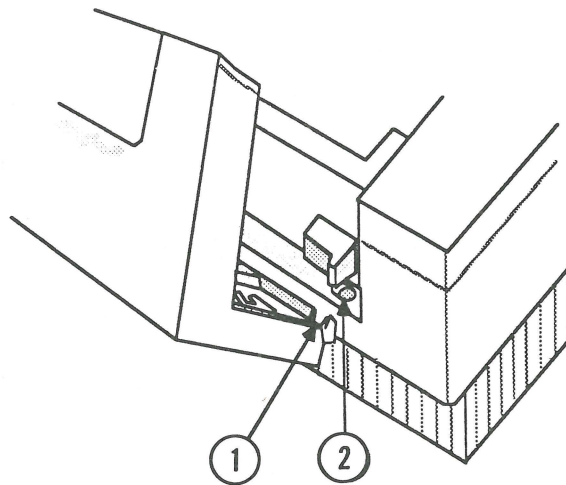
## Replace

1. Place the hinge plate in the slot on the short side of the front cover (Figure 2).



**FIGURE 2**

2. Place the front cover on the main cover so that the hooks on the hinge plate (Figure 3, #1) mate with the corresponding hooks on the main cover (Figure 3, #2).



**FIGURE 3**

3. Slide the hinge plate and front cover together, and install the four hinge plate Phillips screws.

***CAUTION:*** Do not overtighten the screws, or you may strip the threads and permanently damage the front cover.

---

## **□ REAR COVER**

### **Materials Required**

None

### **Remove**

1. Open the front cover by grasping its sides and rotating it up and toward you.
2. Open the rear cover by grasping its sides at the front, lifting up, and pivoting it back.
3. Remove the cover by lifting it straight up.

### **Replace**

1. Hold the cover straight up and lower the two brackets into their corresponding hinges in the main cover.
2. Lower the rear cover to close it.
3. Lower the front cover to close it.

---

## □ MAIN COVER

### Materials Required

#2 Phillips screwdriver

### Remove

1. Remove the rear cover.

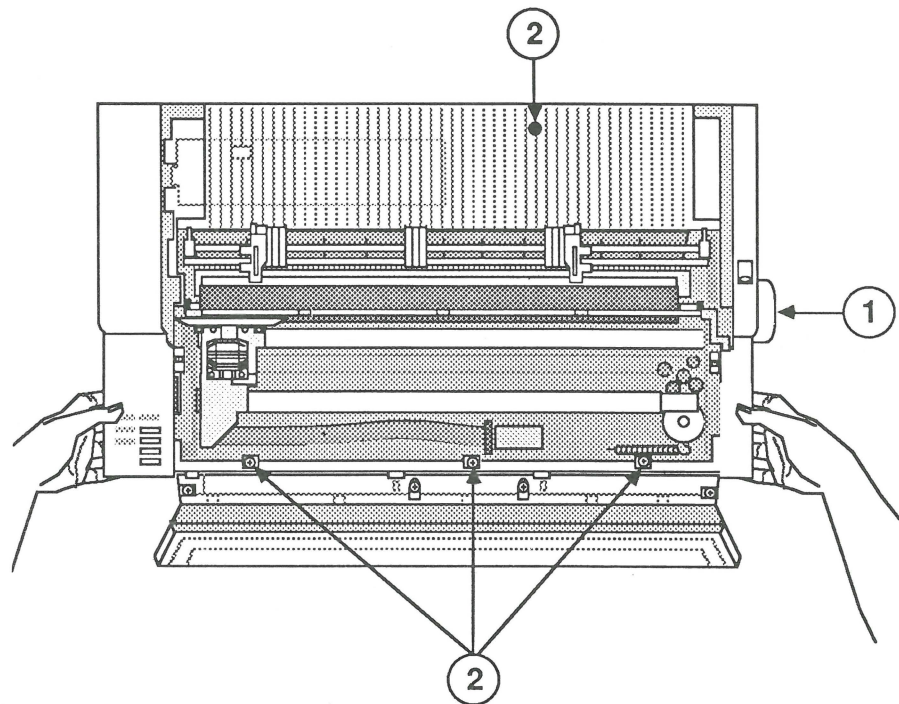
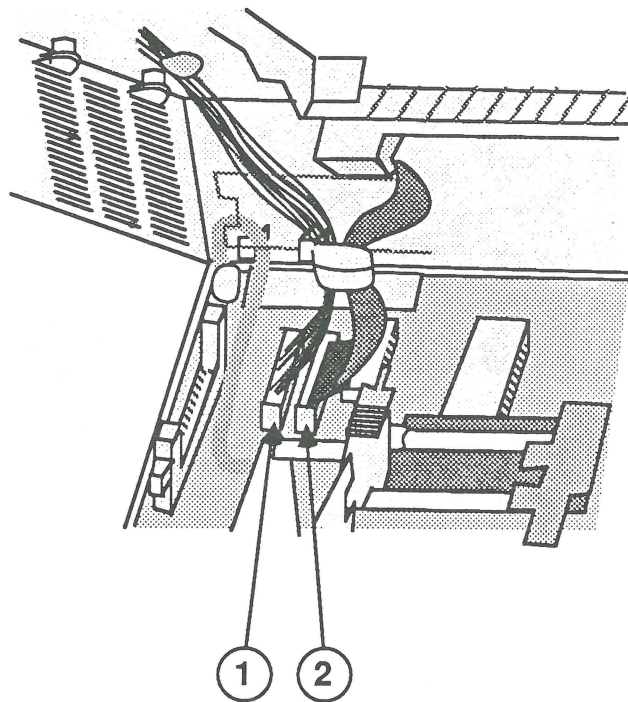


FIGURE 4

2. Remove the platen knob (Figure 4, #1) by pulling it to the right, away from the printer.
3. Loosen the four captive Phillips screws (Figure 4, #2) securing the main cover to the printer base.
4. Place your fingers under the opened front cover with your thumbs wrapped around the main cover (Figure 4). Lift the main cover up to disengage the catches from the front of the printer.
5. Pivot the front of the main cover up until you hear the catches at the rear of the cover "snap" loose from the base of the printer. Hold the cover in this position. **DO NOT** pull the cover away from the printer yet.

6. Disconnect the two cables from the main board:



**FIGURE 5**

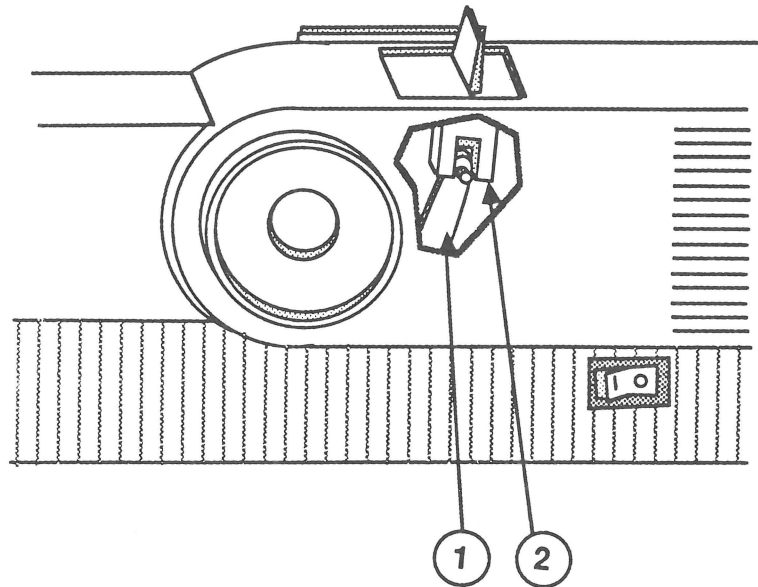
- Control Panel PCA cable from connector CN13 (Figure 5, #1)
- Option Card PCA cable from connector CN15 (Figure 5, #2)

## **Replace**

1. Place the main cover so that it is standing up behind the printer.
2. Tilt the main cover forward slightly, and connect the two cables from the main cover to the main board:
  - Control Panel PCA cable to connector CN13
  - Option Card PCA cable to connector CN15

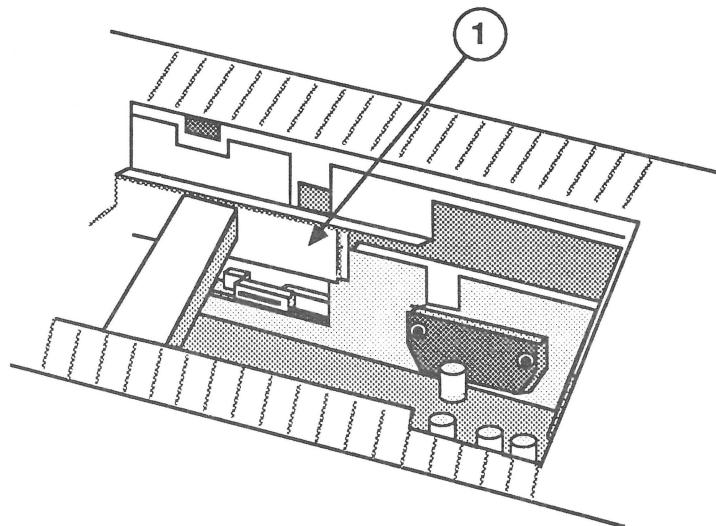
3. Hold the main cover by its sides and lower the cover onto the base of the printer, back first.

Watch the following as you do:



**FIGURE 6**

- a) The paper-feed arm (Figure 6, #1) should be engaged in the paper-feed lever (Figure 6, #2).



**FIGURE 7**

- b) The plastic divider in the option card compartment should be in front of the power supply heat sink (Figure 7, #1).



4. Partially screw in the four captive Phillips screws that secure the main cover to the bottom cover. Then tighten them.
5. Install the platen knob on the right side of the printer.
6. Replace the rear cover.

---

## □ CONTROL PANEL PCA AND CABLE

### Materials Required

#2 Phillips screwdriver

### Remove

1. Remove the main cover and place it upside down on a **padded** work surface.

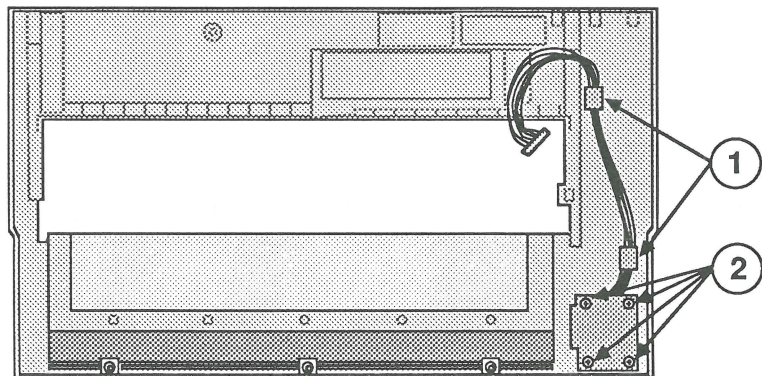


FIGURE 8

2. Remove the control panel cable from its two retaining clips (Figure 8, #1) by **gently** lifting the top part of the clip with your forefinger and sliding the cable out with your other hand.
3. Remove the four Phillips screws holding the control panel PCA to the main cover (Figure 8, #2) and lift out the control panel and cable.
4. Unplug the cable from the control panel PCA.

## Replace

1. Connect the non-toroid end of the control panel cable to the control panel PCA.

**Note:** The cable connector is keyed and can only be installed one way. If it doesn't fit, **don't** force it. Turn the connector over and reconnect it.

2. Place the control panel PCA into position and install the four Phillips screws that secure it to the main cover.

**Note:** Be careful not to overtighten the screws or you may strip the threads and permanently damage the main cover.

3. Place the control panel cable into its two retaining clips.
4. Replace the main cover.

---

## ❑ OPTION CARD CABLE

### Materials Required

#2 Phillips screwdriver

## Remove

1. Remove the main cover and place it on a **padded** work surface.

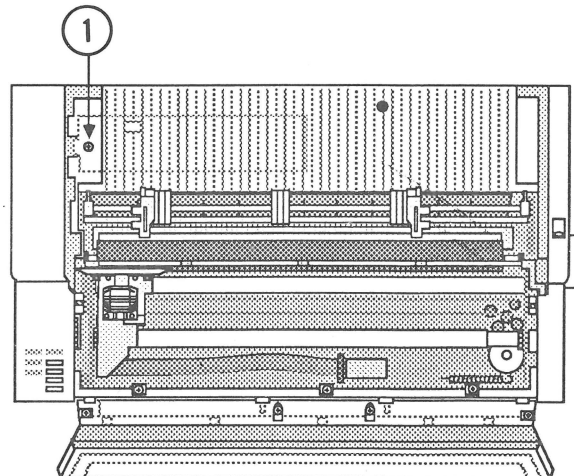
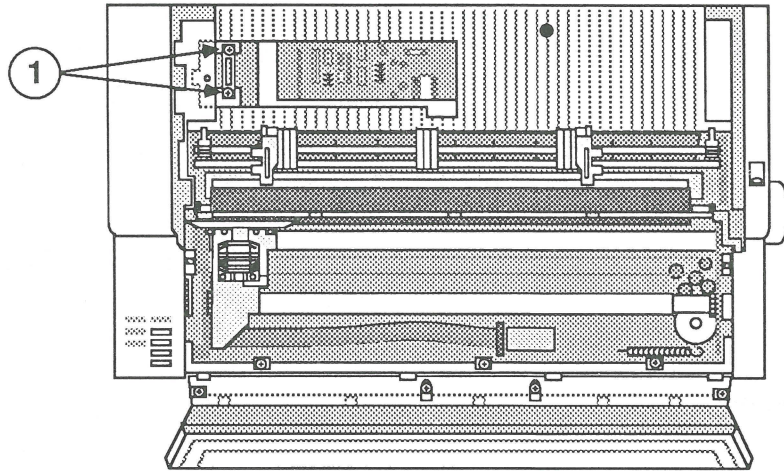


FIGURE 9

2. Remove the Phillips screw securing the option card cover to the main cover (Figure 9, #1).



**FIGURE 10**

3. Remove the two Phillips screws securing the option card cable to the main cover (Figure 10, #1) and remove the cable.

### **Replace**

1. Place the cable in position and install the two Phillips screws that secure it to the main cover.
2. Place the option card cover in position and replace the Phillips screw to secure it to the main cover.
3. Replace the main cover.

---

## **□ TRACTOR BLOCK**

### **Materials Required**

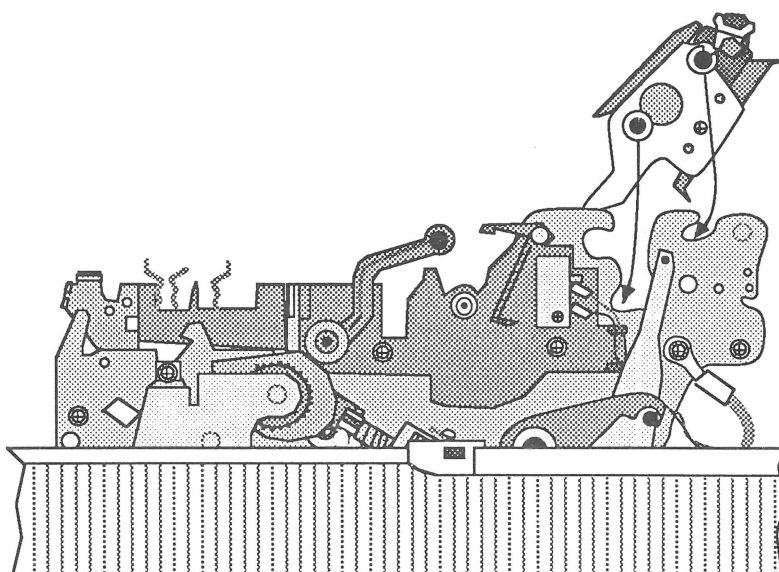
None

### **Remove**

1. Remove the main cover.
2. Push the blue tractor levers back to release the tractor assembly.

3. Remove the tractor levers by placing your thumb on the metal cylinder and your forefinger on the tractor lever and pushing the lever toward the center of the printer. This will require a bit of pressure, but don't worry, you won't break the lever.
4. Remove the tractor by first pressing it toward the rear of the printer and then lifting up.

## Replace



**FIGURE 11**

1. Align the four posts on either side of the tractor assembly with the slots in the mechanical assembly (Figure 11), and lower the tractor into position.
2. Snap the left and right tractor levers into place.
3. Replace the main cover.

---

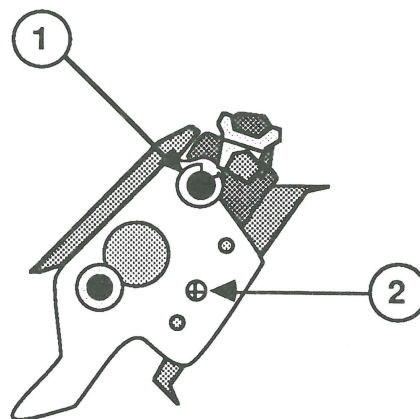
## ❑ RIGHT TRACTOR ASSEMBLY

### Materials Required

Grip-ring pliers or small, flatblade screwdriver  
#2 Phillips screwdriver

### Remove

1. Remove the tractor block and place it on a **padded** work surface.



**FIGURE 12**

2. Using the grip-ring pliers or the flatblade screwdriver, remove the E-ring securing the right tractor frame to the upper tractor shaft (Figure 12, #1).
3. Remove the Phillips screw securing the right tractor frame to the paper pan (Figure 12, #2).
4. Slide the right tractor frame off the two tractor shafts.
5. Slide the tractor spacer off the upper tractor shaft.
6. Flip the blue tractor release lever into the "up" position, and slide the tractor assembly off the tractor shafts.



## Replace

1. Slide the right tractor assembly onto the tractor shafts. Orient the tractor assembly so that the paper clamp opens to the right and faces forward.
2. Slide the tractor spacer onto the upper tractor shaft.
3. Slide the tractor frame onto the tractor shafts. Orient the frame so that the projection points down and the three smaller holes are closest to the paper pan.
4. Position the tractor frame against the paper pan so that the positioning pins on the pan engage with the holes in the frame. Replace the Phillips screw to secure the tractor frame to the paper pan.
5. Snap the E-ring into place to secure the upper tractor shaft to the tractor frame.
6. Replace the tractor block.

---

## ☐ LEFT TRACTOR ASSEMBLY

### Materials Required

None

## Remove

1. Remove the right tractor assembly.
2. Slide the paper guide off the tractor shafts.
3. Flip the blue tractor release lever into the "up" position, and slide the left tractor assembly off the tractor shafts.

## Replace

1. Slide the left tractor assembly onto the tractor shafts. Orient the tractor assembly so that the paper clamp opens to the left and faces forward.
2. Slide the paper guide onto the tractor shafts. Orient the guide so that **square tractor shaft** is in the **round opening** and the **round tractor shaft** is in the **square opening**.
3. Replace the right tractor assembly.

---

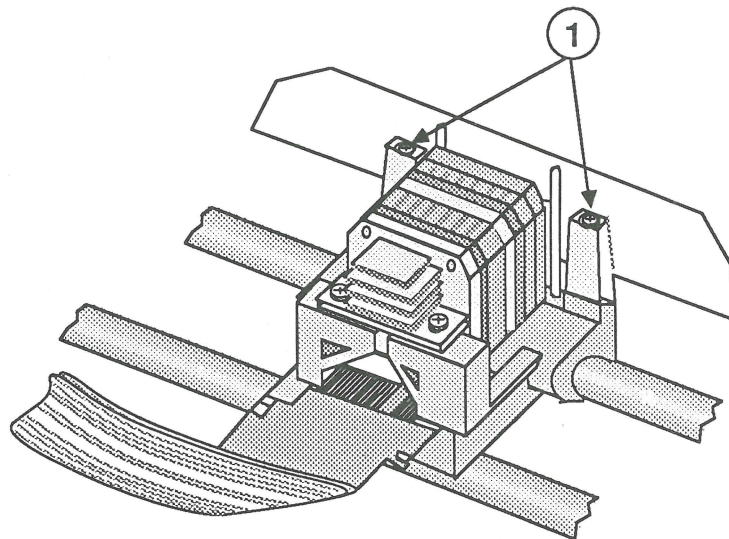
## □ CARD GUIDE

### Materials Required

Jeweler's Phillips magnetic screwdriver

### Remove

1. Open the front cover and move the paper thickness lever to position 5.
2. Remove the ribbon, if present.



**FIGURE 13**

3. Remove the two Phillips screws securing the card guide to its two mounting posts (Figure 13, #1).
4. Lift the card guide up and out of the printer.

### Replace

1. Slide the card guide over its two mounting posts.
2. Install, but **don't tighten**, the two Phillips screws that secure the card guide to the mounting posts.
3. Perform the "Card Guide Adjustment," Section 3, Adjustments.

---

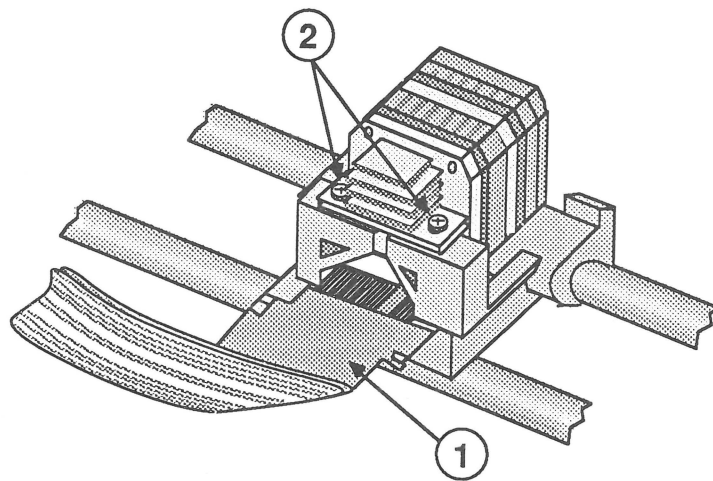
## □ PRINT HEAD

### Materials Required

#2 Phillips screwdriver  
Small, flatblade screwdriver

### Remove

1. Remove the main cover.
2. Move the carrier assembly to the center of the printer.



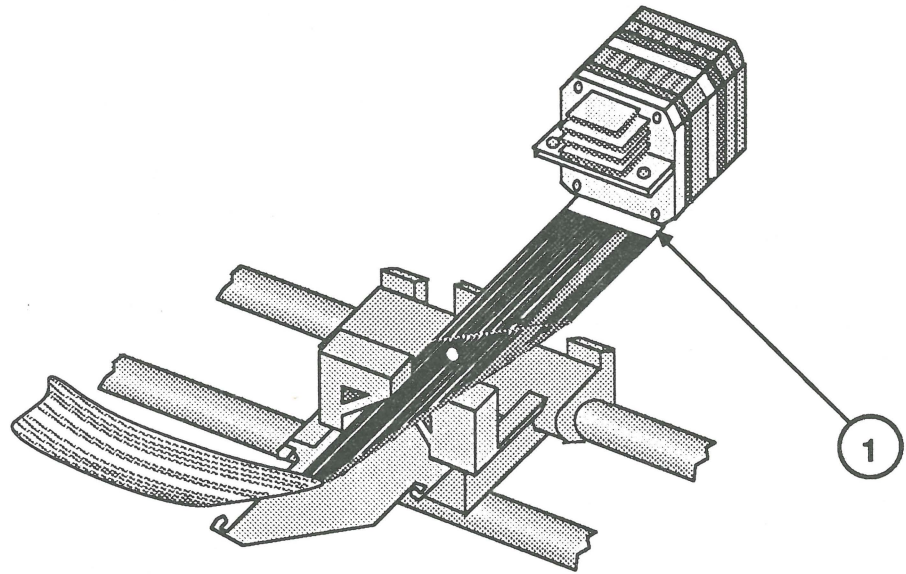
**FIGURE 14**

3. Remove the flexible PCB holder (Figure 14, #1).
4. Remove the two Phillips screws (Figure 14, #2) holding the print head to the carrier assembly.
5. Lift up and hold the print head until it is approximately two inches above the carrier assembly.

---

**CAUTION:** *If you lift the print head too high you will strain and possibly damage the cables attached to it.*

---



**FIGURE 15**

6. Place the small, flatblade screwdriver in the slot of the print head connector (Figure 15). Gently rotate the screwdriver in either direction until the sliding portion of the connector moves away from the rest of the connector. Slide the cable from the connector.
7. Repeat step 6 for the other cable.

## **Replace**

1. Slide the flexible PCB cable as far as you can toward the rear of the printer through its slot in the carrier assembly.
2. Slide the first cable into the rear connector on the print head.
3. While holding the cable in place, press the sliding portion of the connector toward the body of the connector until it clicks into place.

**Hint:** It's easier to slide the connector together if you place your thumb and forefinger on the ends of the connector.

4. Repeat steps 2 and 3 for the other cable.

5. Place the print head in position in the carrier assembly.
6. Replace the flexible PCB holder.
7. Start the two screws that hold the print head to the carrier assembly, but **do not tighten them**.
8. Perform the "Print Head Gap Adjustment," in Section 3, Adjustments.
9. Replace the main cover.

---

## □ PRINT HEAD TO RELAY PCB CABLE

### Materials Required

Small, flatblade screwdriver

### Remove

1. Remove the print head.
2. Slide the carrier assembly to the far left side of the printer.

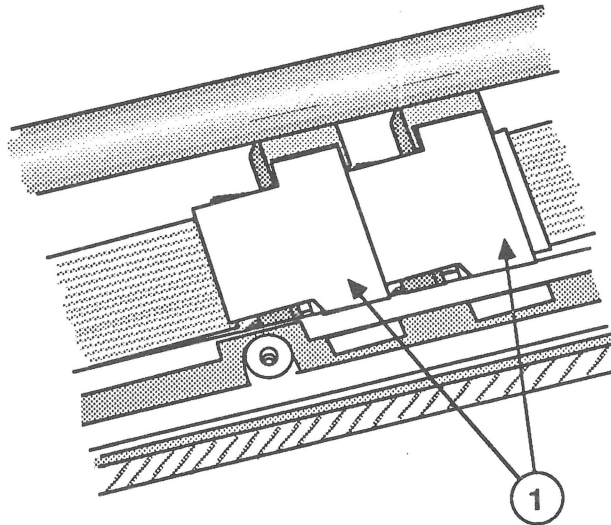


FIGURE 16



3. Remove the two flexible PCB holders (Figure 16, #1) by pulling the holder up from the center.

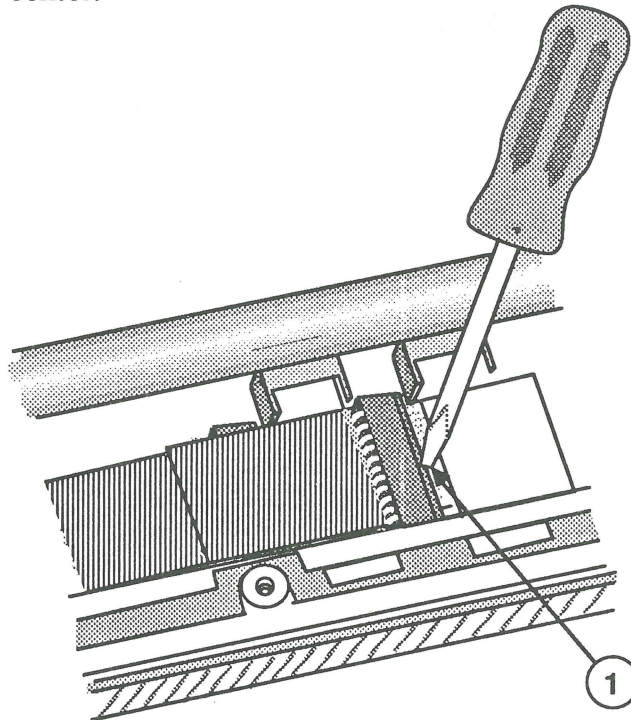


FIGURE 17

4. Place the small, flatblade screwdriver in the slot of the flexible relay PCB connector (Figure 17, #1). Gently rotate the screwdriver in either direction until the sliding portion of the connector moves away from the rest of the connector. Slide the cable from the connector.
5. Repeat step 4 for the other cable.

## Replace

1. Take the print head cable with the **narrower** connector (this will be the cable on top exiting from the carrier assembly) and slide the cable into the flexible relay PCB connector on the left.
2. While holding the cable in place, press the sliding portion of the connector toward the body of the connector until it clicks into place.
3. Repeat steps 1 and 2 for the other cable, the one with the **wider** connector.
4. Replace the print head.

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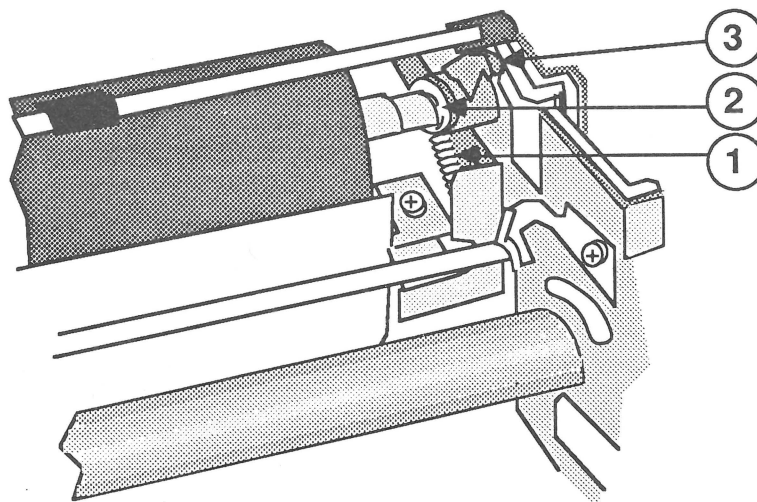
## □ PLATEN ASSEMBLY

### Materials Required

Flatblade screwdriver  
Grip-ring pliers or a small, flatblade screwdriver  
Needlenose pliers

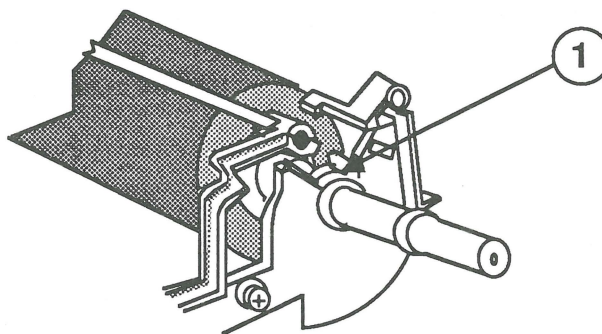
### Remove

1. Remove the main cover and card guide.
2. Move the carrier assembly to the center of the printer.
3. Open the paper bail by lifting it away from the platen.



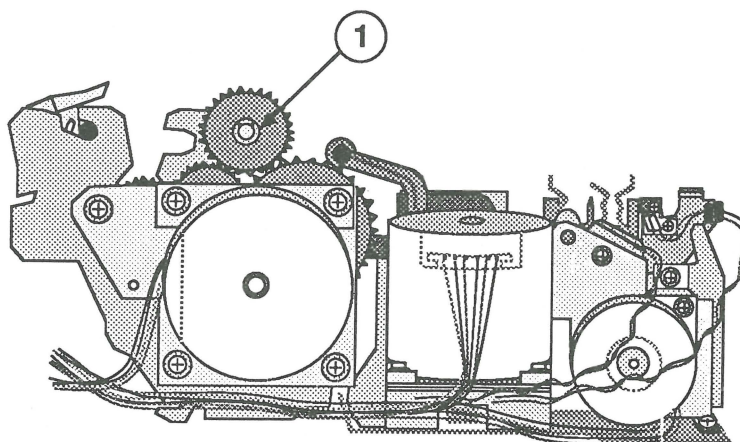
**FIGURE 18**

4. Remove the left and right springs between the gap adjustment cams and the paper guide plate (Figure 18, #1).
5. Using the grip-ring pliers or the small, flatblade screwdriver, remove the E-rings on the left and right gap adjustment cams (Figure 18, #2).
6. Move the left and right gap adjustment cams (Figure 18, #3) inward, toward the platen.



**FIGURE 19**

7. Using the flatblade screwdriver, move the platen catches (Figure 19, #1) inward, toward the platen.



**FIGURE 20**

8. Remove the E-ring securing the cut sheet feeder idler gear (Figure 20, #1), and remove the idler gear.

**Hint:** It is easier to remove the idler gear if you first align the teeth of the two gears so they mesh.

9. Lift the platen from the mechanical assembly.

## Replace

Clean the paper-out sensor before you replace the platen assembly. Refer to Section 4, Preventive Maintenance for instructions.

1. Place the platen assembly in the mechanical assembly.
2. Replace the cut sheet feeder idler gear and snap the E-ring into place.
3. Move the left and right platen catches outward until they engage fully with the platen holder.
4. Snap the left and right gap adjustment cam E-rings into place. Make sure the metal washer is **behind** the E-ring.
5. Attach the left and right springs between the gap adjustment cams and the paper guide plate.
6. Replace the card guide and perform the "Card Guide Adjustment," Section 3, Adjustments.
7. Replace the main cover.

---

## □ PINCH ROLLER ASSEMBLY

### Materials Required

None

### Remove

1. Remove the platen assembly.

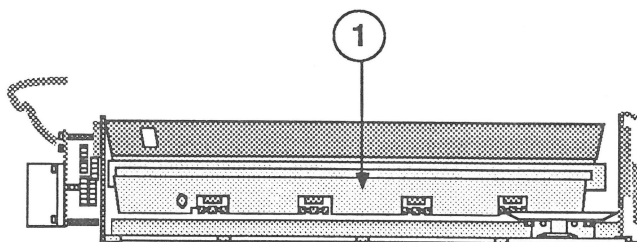
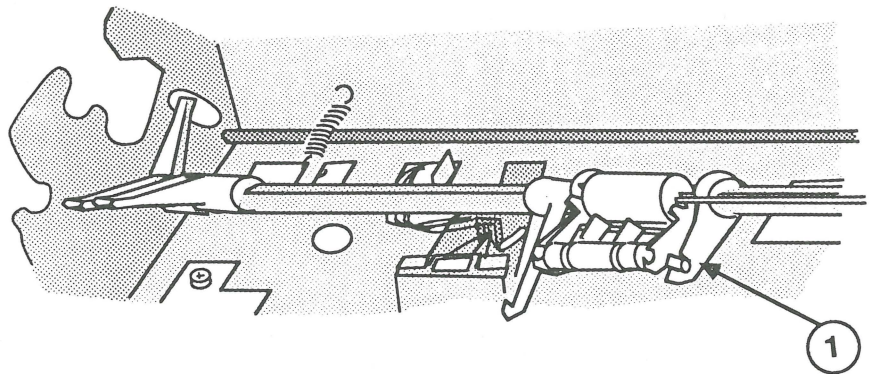


FIGURE 21

2. Simultaneously lift and flip back the paper guide plate (Figure 21, #1) to expose the pinch roller assembly.
  3. Lift out the pinch roller assembly.
1. Place the pinch roller assembly in position.

**Replace**



**FIGURE 22**

- Make sure the positioning pins on each roller assembly mate with their corresponding slots in the mechanical assembly (Figure 22, #1).
2. Return the paper guide plate to its original position.
  3. Replace the platen assembly.



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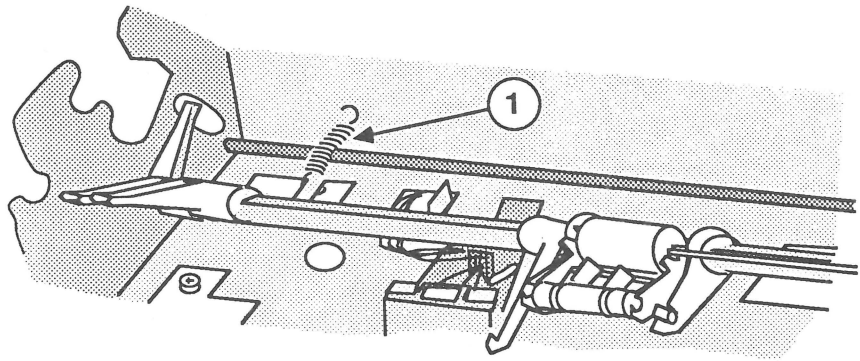
## □ PAPER-OUT SENSOR

### Materials Required

Small, diagonal cutters  
Needlenose pliers

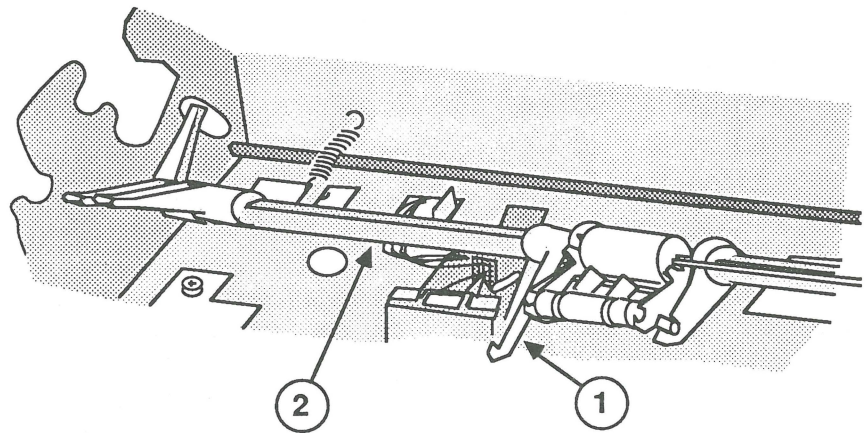
### Remove

1. Remove the mechanical assembly.
2. Remove the platen assembly.



**FIGURE 23**

3. Remove the left and right springs between the paper pan and the paper-guide plate (Figure 23, #1).
4. Remove the paper pan.
5. Cut the cable ties that hold the paper-out sensor cable to the rest of the bundle of cables.

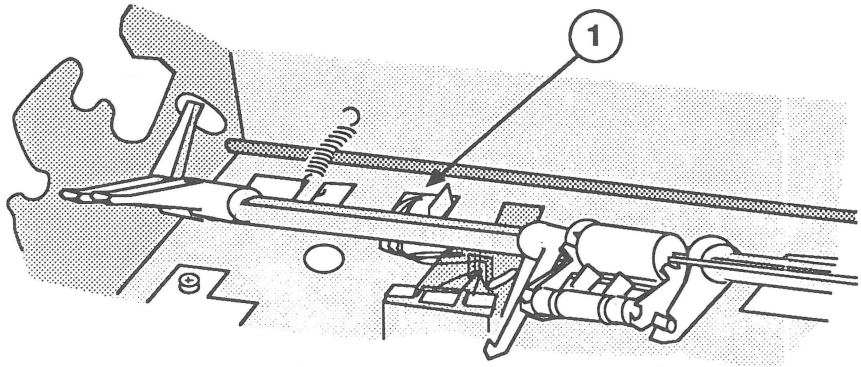


**FIGURE 24**

6. Use the needlenose pliers to remove the paper-out sensor arm (Figure 24, #1) from the release lever shaft (Figure 24, #2).
7. **Gently**, turn the mechanical assembly over and place it on a **padded** work surface. Using the needlenose pliers, squeeze in the two tabs on the paper-out sensor holder. Then push the holder up.
8. **Gently**, turn the mechanical assembly over and place it on the **padded** work surface. Remove the paper-out sensor holder by working it out from under the release lever shaft.

## Replace

**Note:** Avoid touching the optical sensor while performing these steps. If you should touch the sensor, refer to the cleaning instructions in Section 4, Preventive Maintenance **prior** to replacing the platen assembly.



**FIGURE 25**

1. Route the paper-out sensor cable through the cut out in the mechanical assembly (Figure 25, #1).
2. Place the back end of the paper-out sensor holder under the release lever shaft. Then slide the holder back until it is positioned in the opening in the mechanical assembly.
3. Press the holder down into the opening until you hear a click.
4. Snap the paper-out sensor arm onto the release lever shaft. The arm should face toward the front of the printer.
5. Attach the left and right springs between the paper pan and the paper guide plate. The paper-guide plate should be oriented so that the solid portion is toward the rear of the mechanical assembly.
6. Place the paper guide plate in position.
7. Replace the platen assembly.
8. Replace the mechanical assembly.

---

## ❑ TRACTOR DRIVE GEAR

### Materials Required

Grip-ring pliers or small, flatblade screwdriver

### Remove

1. Remove the tractor assembly.
2. Using the grip-ring pliers or the screwdriver, remove the E-ring holding the tractor drive gear in place.
3. Slide the drive gear from the shaft.

### Replace

1. Slide the drive gear onto the shaft with the slotted portion of the gear on the inside.
2. Snap the E-ring into place to secure the drive gear to the shaft.
3. Replace the tractor assembly.

---

## ❑ CASSETTE LATCH

### Materials Required

Small, flatblade screwdriver

### Remove

1. Remove the main cover.
2. Use the screwdriver to pry the inside of the cassette latch inward, toward the center of the printer, and upward.

### Replace

1. Place the cassette latch in position and press down until you hear a click.
2. Replace the main cover.

---

## □ MAIN BOARD

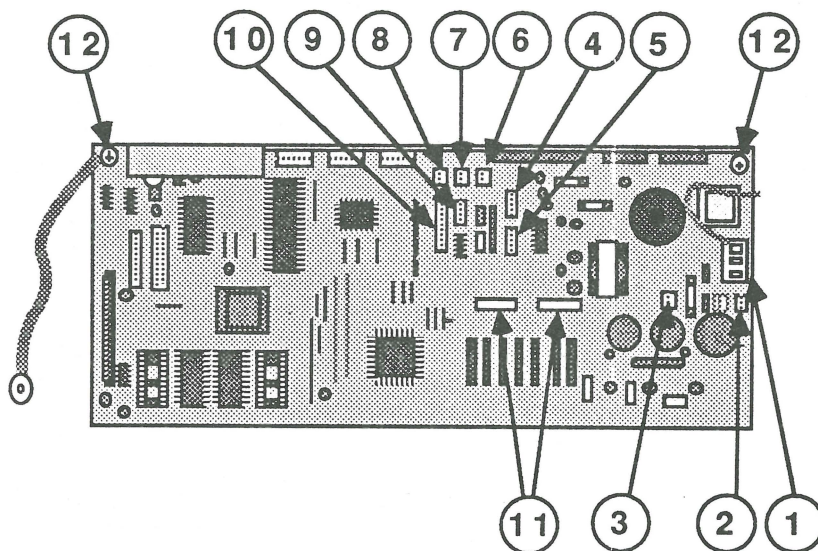
### Materials Required

#2 Phillips screwdriver

### Remove

1. Remove the main cover.
2. Orient the printer on your workbench so that the main board is near you.
3. Disconnect the following cables from the main board:
  - Power supply cable from CN1 (Figure 26, #1)
  - Auto load solenoid cable from CN8 (Figure 26, #2)
  - Cut sheet feeder switch cable from CN11 (Figure 26, #3)
  - Carrier motor cable from CN5 (Figure 26, #4)
  - Paper-out sensor cable from CN9 (Figure 26, #5)
  - Paper handling change switch cable from CN12 (Figure 26, #6)
  - Platen gap adjustment sensor cable from CN18 (Figure 26, #7)
  - Home position switch cable from CN10 (Figure 26, #8)
  - Paper feed motor cable from CN6 (Figure 26, #9)
  - Color ribbon assembly cable from CN7 (Figure 26, #10)
  - Print head flexible relay PCBs from CN3 and CN4 (Figure 26, #11)



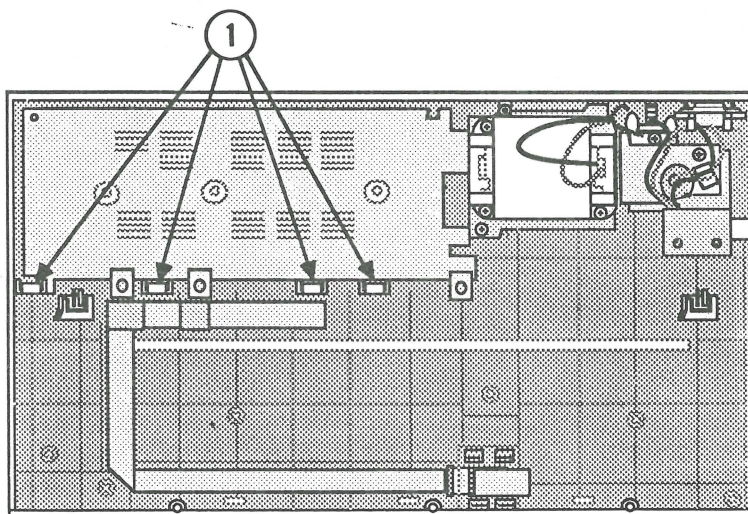


**FIGURE 26**

4. Remove the two Phillips screws (Figure 26, #12) securing the main board to the base of the printer.
5. Lift the edge of the main board closest to you, and after it clears the case, pull it toward you to remove it from the printer.

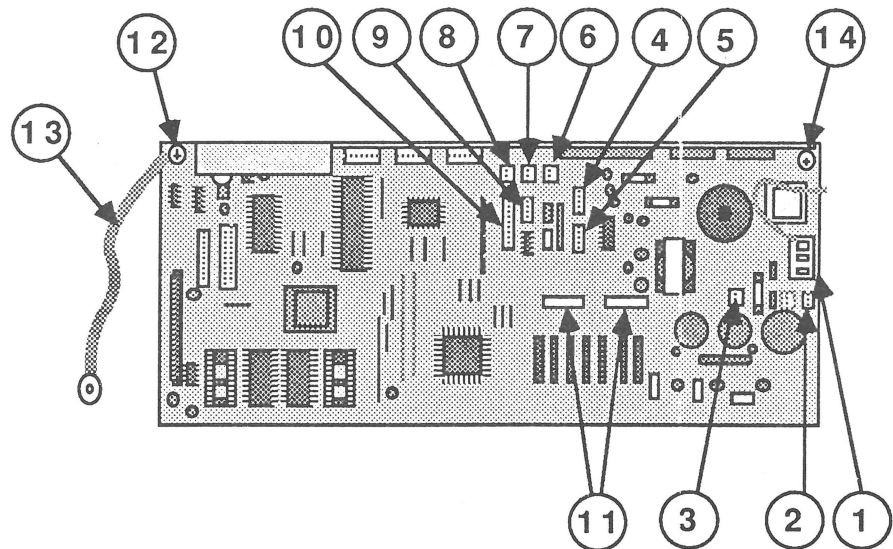
## Replace

1. Put the front edge of the main board into the four plastic clips in the base of the printer (Figure 27, #1). Lower the rear edge of the board into place.



**FIGURE 27**

2. Install the Phillips screw (Figure 28, #12) that secures the right side of the main board to the base of the printer. Also, be sure to reattach the ground braid (Figure 28, #13).
3. Install the Phillips screw (Figure 28, #14) at the left side of the main board.



**FIGURE 28**

4. Connect the following cables to the main board:
    - Power supply cable from CN1 (Figure 28, #1)
- Note:** Be careful to route the power supply cable **away from** the aluminum heatsink at the rear of the printer.
- Auto load solenoid cable from CN8 (Figure 28, #2)
  - Cut sheet feeder switch cable from CN11 (Figure 28, #3)
  - Carrier motor cable from CN5 (Figure 28, #4)
  - Paper-out sensor cable from CN9 (Figure 28, #5)

- Paper-detect switch cable from CN12  
(Figure 28, #6)
  - Platen gap position sensor cable from CN18  
(Figure 28, #7)
  - Home position switch cable from CN10  
(Figure 28, #8)
  - Paper feed motor cable from CN6  
(Figure 28, #9)
  - Color ribbon assembly cable from CN7  
(Figure 28, #10)
  - Print head flexible relay PCBs from CN3 and  
CN4 (Figure 28, #11)
5. Replace the main cover.

---

## □ FUSES

### Materials Required

Fuse puller or a small, flatblade screwdriver  
Replacement fuse of the correct voltage and amperage

### Remove

1. Remove the main cover.
2. Use either the fuse puller or the flatblade screwdriver to remove the desired fuse. (Refer to "Illustrated Parts," Section IPL, for fuse placement information.)

### Replace

1. Snap a fuse of the correct size into the fuse holder.

**Power Supply Fuse Rating:** 250 Volts/3 Amps

**Main Board Fuse Ratings:**

<b>FU1</b>	125 Volts/8 Amps
<b>FU2</b>	125 Volts/3 Amps
<b>FU3</b>	125 Volts/1.5 Amps

2. Replace the main cover.

---

## ❑ POWER SUPPLY ASSEMBLY

### Materials Required

#2 Phillips screwdriver  
Long needlenose pliers  
Sharp knife  
Soldering iron  
Rosin-core solder (60% tin, 40% lead)  
Pen  
Masking tape  
1 inch of heat-shrink tubing  
Heat gun

### Components

The group of components that make up the power supply assembly consists of the AC inlet receptacle, the AC power switch, the power transformer, the noise filter PCA, and the power supply itself, which is part of the main board. The following procedures deal with the removal and replacement of the first four items mentioned. If the power supply itself is identified as faulty, go to the main board take-apart section.

### AC Power Switch

To remove or replace the AC power switch, perform the following procedure:

#### *Remove*

1. Remove the main cover.
2. Remove the power switch (Figure 29, #1) from the case by pressing, with the needlenose pliers, the two plastic tabs at the sides of the switch and, at the same time, pushing the switch out of the case.
3. Remove the four power switch wires through the slot (Figure 29, #2) in the case.

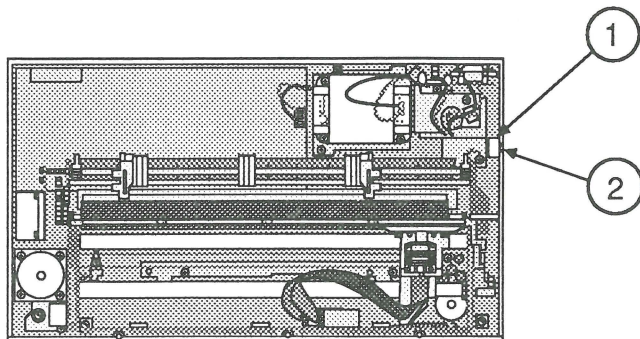


FIGURE 29

4. Using the knife, cut away the heat-shrink tubing from the four power switch posts.
5. Mark the four wires connected to the power switch with the numbers 1 through 4, starting in the upper left corner and proceeding clockwise.
6. Unsolder the four wires from the power switch.

### *Replace*

1. Slide a 1/4-inch length of heat-shrink tubing on each of the power switch wires.
2. Strip 1/8 inch of insulation from each of the power switch wires, and tin the wire.
3. Solder the four wires to the power switch. The wire marked number 1 should be soldered to the post in the upper-left corner and each wire to the post clockwise to the previous one.
4. Use the heat gun to shrink the heat-shrink tubing around each connection.
5. Place the four power switch wires into the slot in the bottom cover of the printer.
6. Place the power switch into its corresponding opening in the bottom cover of the printer and push until it clicks into place.

**Note:** Make sure that the **0** on the power switch is toward the **rear** of the printer.

7. Replace the main cover.

### **Transformer/ Noise Filter PCA Assembly Bracket**

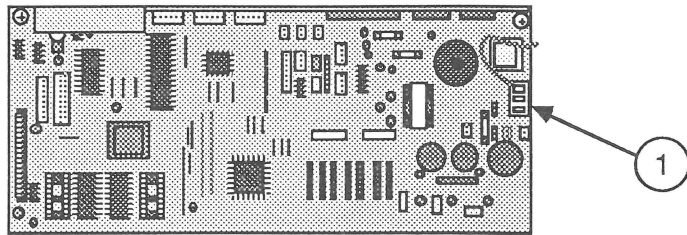
The transformer and noise filter are attached to the transformer/noise filter PCA bracket. To remove or replace this bracket with the transformer and filter board on it, perform the following procedure:

### *Remove*

1. Remove the main cover.

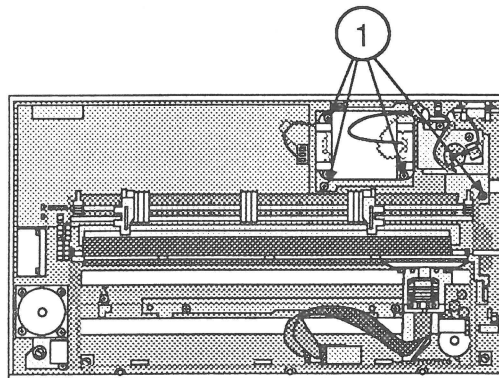


2. Disconnect the transformer cable from main board connector CN1 (Figure 30, #1).



**FIGURE 30**

3. Remove the power switch from the case by pressing, with the needlenose pliers, the two plastic tabs at the sides of the switch and, at the same time, pushing the switch out of the case.
4. Remove the four power switch wires by pulling them through the slot in the case.
5. Remove the four Phillips screws (Figure 31, #1) that secure the transformer/filter board assembly bracket to the base of the printer.



**FIGURE 31**

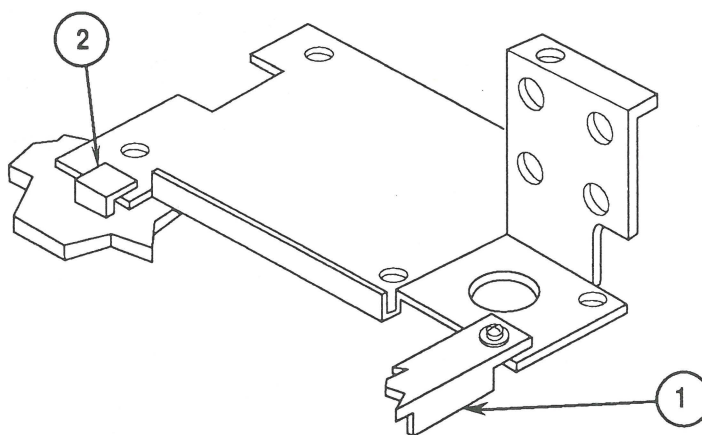
6. Carefully pivot the transformer/noise filter PCA assembly bracket toward the mechanical assembly. Once the noise filter PCA clears the AC power receptacle, slide the bracket toward the rear of the printer and carefully place the bracket assembly on the workbench beside or behind the printer.



7. Remove the AC power receptacle from the base of the printer by pushing the two plastic retaining clips toward the front of the printer and sliding the receptacle up and out.

### *Replace*

1. Rest the transformer/noise filter PCA assembly bracket behind the base of the printer near where it is to be installed, and slide the power receptacle into its two plastic retaining clips until it clicks into position.
2. Move the assembly bracket into position in the printer and verify that:
  - No cables are caught underneath.
  - The metal bracket at the left side is above the assembly bracket (Figure 32, #1).
  - The assembly bracket is within its plastic retaining clip on the right side (Figure 32, #2).



**FIGURE 32**

3. Place the four power switch wires in the slot in the base of the printer.
4. Place the power switch in its corresponding opening in the base of the printer, and push until the switch clicks into place.

**Note:** Make sure that the **0** on the power switch is toward the **rear** of the printer.

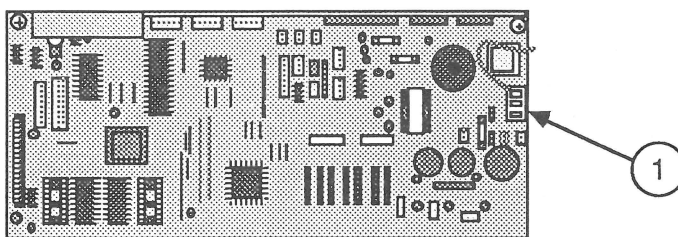
5. Replace the four Phillips screws that secure the transformer/filter board assembly bracket to the base of the printer.
6. Connect the transformer cable to main board connector CN1.
7. Replace the main cover.

## Transformer

To remove the transformer, perform the following procedure.

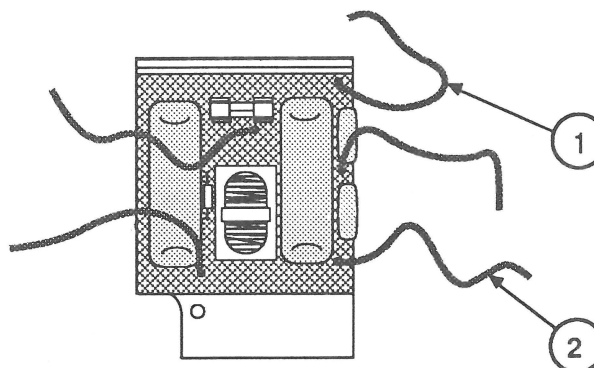
### *Remove*

1. Remove the main cover.
2. Disconnect the transformer cable from main board connector CN1 (Figure 33-A, #1).



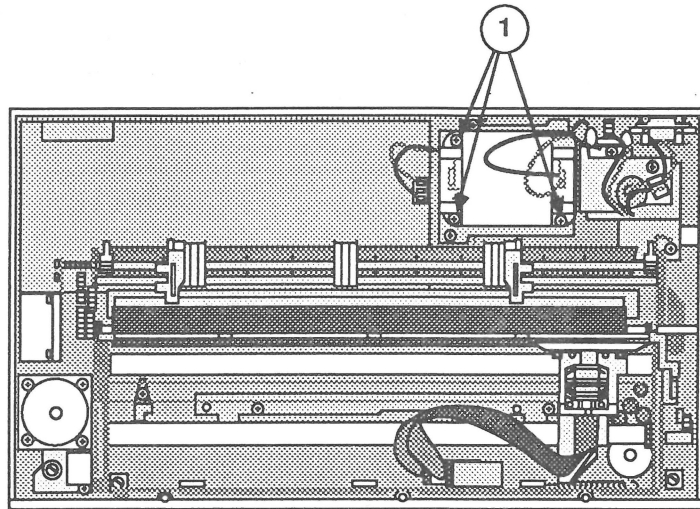
**FIGURE 33-A**

3. Using the needlenose pliers, squeeze each of the four plastic standoffs to release the noise filter PCA.
4. Mark the two transformer wires connected to the noise filter PCA as shown in Figure 33-B.



**FIGURE 33-B**

5. Desolder these two wires from the noise filter PCA.
6. Remove the three Phillips screws securing the transformer to the transformer/noise filter PCA assembly bracket (Figure 33-C, #1) and remove the transformer.



**FIGURE 33-C**

### *Replace*

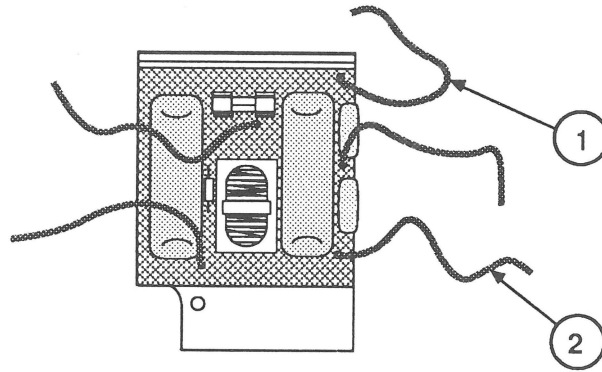
1. Place the transformer in position on the transformer/filter board assembly bracket and replace the three Phillips screws that secure it to the bracket.
2. Solder the two wires to the noise filter PCA. Match the numbers marked on the wires with those in Figure 33-B for correct placement.
3. Place the noise filter PCA in position against the standoffs and press each corner until you hear a click.
4. Plug the connector from the transformer into CN1 on the main board.
5. Replace the main cover.

### **Universal Transformer**

To remove or replace a universal transformer, you must remove the transformer/noise filter PCA assembly bracket first, since you have to remove the voltage selector switch.

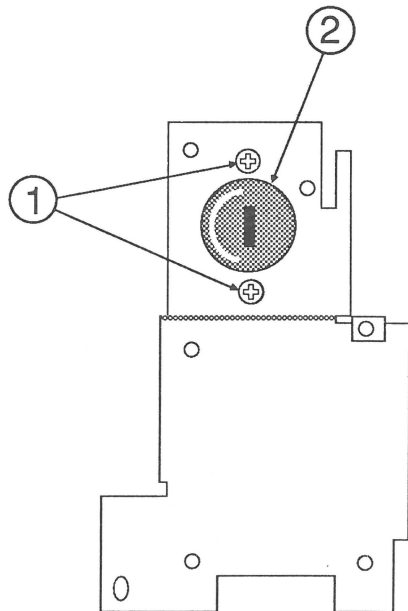
## Remove

1. Remove the transformer/noise filter PCA assembly bracket.
2. Mark the two transformer wires connected to the noise filter PCA as shown in Figure 34-A.



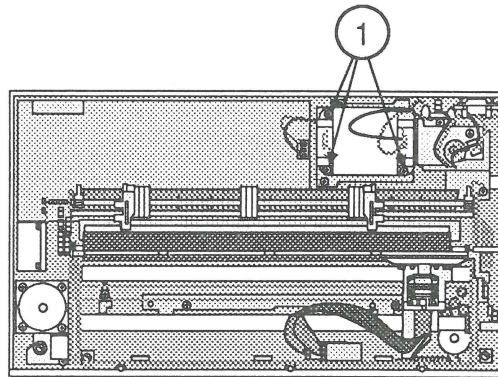
**FIGURE 34-A**

3. Remove the two flat-head 8 x 32 self-tapping screws (Figure 34-B,#1) from the bottom of the bracket assembly. These screws hold the voltage selector switch (Figure 34-B,#2) in place.



**FIGURE 34-B**

4. Remove the three Phillips screws (Figure 34-C) that secure the transformer to the transformer/noise filter PCA assembly bracket, and remove the transformer.



**FIGURE 34-C**

#### *Replace*

1. Place the transformer in position on the transformer/filter board assembly bracket, and replace the three Phillips screws.
2. Place the voltage selector switch over the hole in the bracket, and secure it using the two flat-head screws. The screws go from the bottom of the bracket into the switch.
3. Solder the two wires to the noise filter PCA. Match the numbers marked on the wires with those in Figure 34-A for correct placement.
4. Place the noise filter PCA in position against the standoffs and press each corner until you hear a click.
5. Replace the transformer/filter board assembly bracket.
6. Replace the main cover.

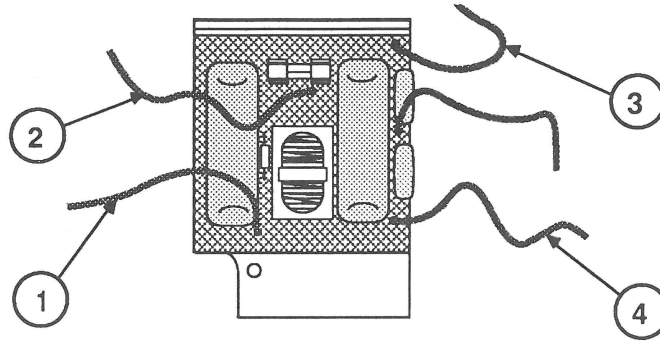
#### **Noise Filter PCA**

To remove the noise filter PCA, perform the following procedure:

#### *Remove*

1. Remove the main cover.

2. Using the needlenose pliers, squeeze each of the four plastic standoffs to release the noise filter PCA.
3. Mark the wires connected to the noise filter PCA as shown in Figure 35.



**FIGURE 35**

4. Desolder each of the wires.

### *Replace*

1. Solder each of the wires to the noise filter PCA. Match the numbers marked on the wires with those in Figure 35 for correct placement.
2. Place the noise filter PCA in position against the standoffs, and press each corner until you hear a click.
3. Replace the main cover.

---

## ☐ HOME POSITION SWITCH

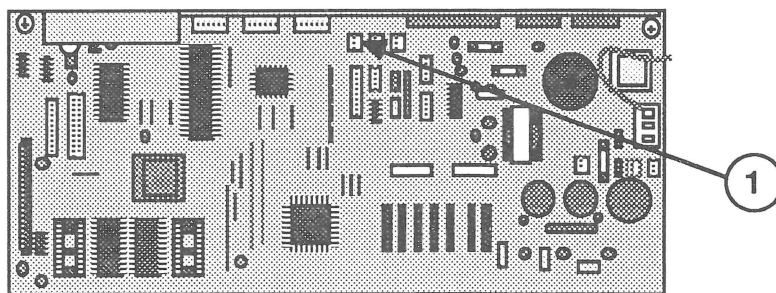
### **Materials Required**

#2 Phillips screwdriver  
Small diagonal cutters

### **Remove**

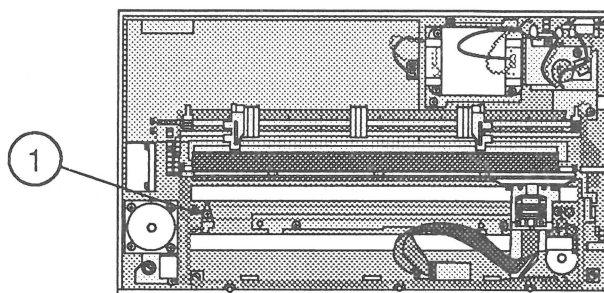
1. Remove the main cover.





**FIGURE 36**

2. Disconnect the home position switch cable from main board cable CN10 (Figure 36, #1).



**FIGURE 37**

3. Remove the Phillips screw (Figure 37, #1) securing the home position switch to the mechanical assembly, and remove the switch.
4. Cut the cable ties that hold the home position switch cable to the rest of the cables routed to the main board.

## Replace

1. Place the home position switch in position, and partially screw in the Phillips screw that secures the switch to the mechanical assembly. Be sure the nipple on the bracket is seated in its mating hole in the mechanical assembly.
2. Route the home position switch cable to the rear of the printer, and connect it to main board connector CN10.
3. Perform the "Home Position Switch Adjustment," Section 3, Adjustments.
4. Replace the main cover.

---

## ❑ CUT SHEET FEEDER SWITCH

### Materials Required

#1 Phillips screwdriver

### Remove

1. Remove the main cover.

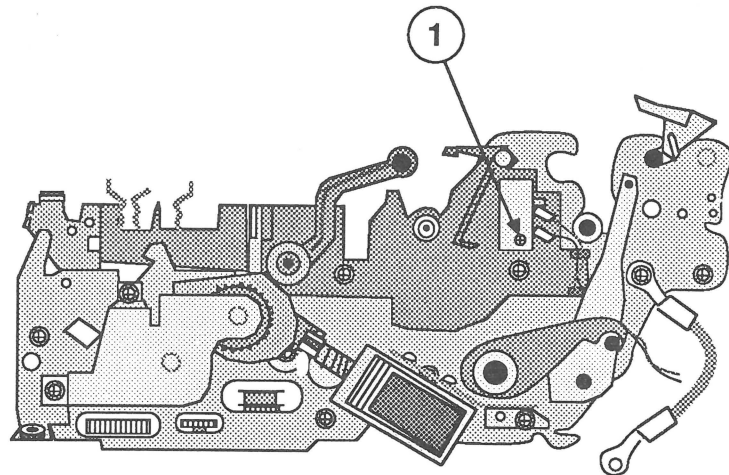


FIGURE 38

2. Remove the Phillips screw that secures the cut sheet feeder switch to the paper bail/platen bracket (Figure 38, #1).
3. Remove the switch and the cable from the cable clips on the paper bail/platen bracket.

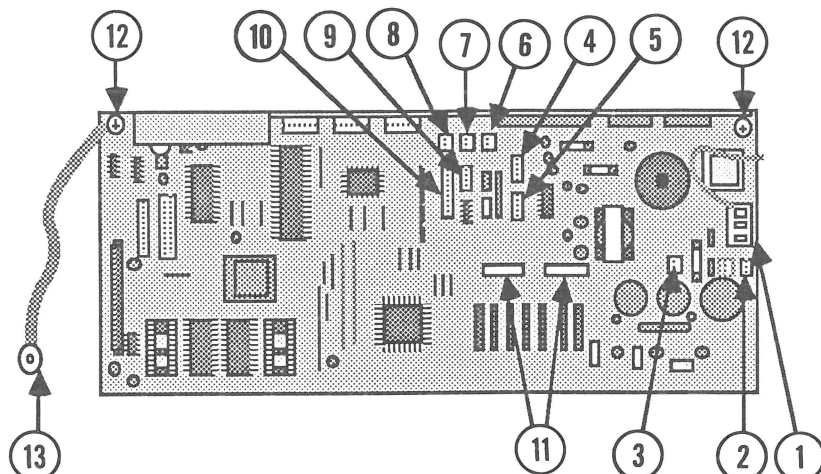
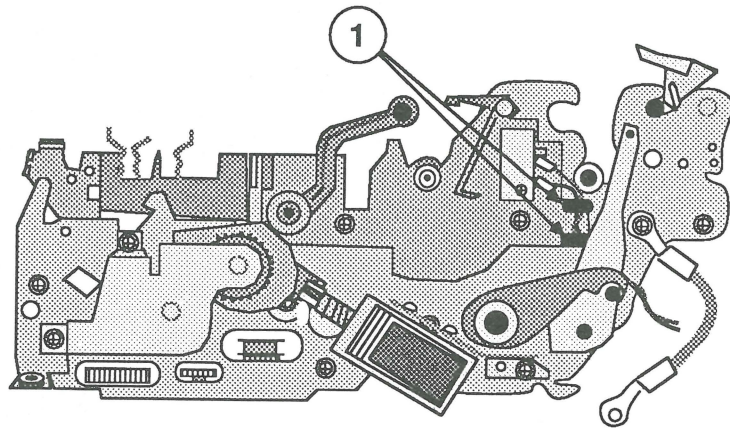


FIGURE 39

4. Disconnect the cable from main board connector CN11 (Figure 39, #1).
5. Remove the cable from the cable clip on the back of the mechanical assembly.
6. Remove the switch.

## Replace

1. Mount the cut sheet feeder switch on the positioning pin of the paper bail/platen bracket, with the lever pointing down. Secure the switch with the Phillips screw.



**FIGURE 40**

2. Route the cable through the cable clips on the paper bail/platen bracket (Figure 40, #1).
3. Route the cable through the cable clip on the back of the mechanical assembly.
4. Connect the cable to main board connector CN11.
5. Replace the main cover.

---

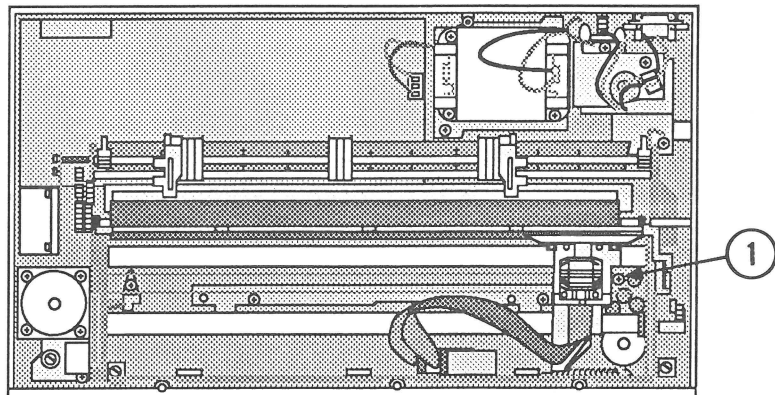
## □ CARRIER DRIVE MOTOR

### Materials Required

#2 Phillips magnetic screwdriver

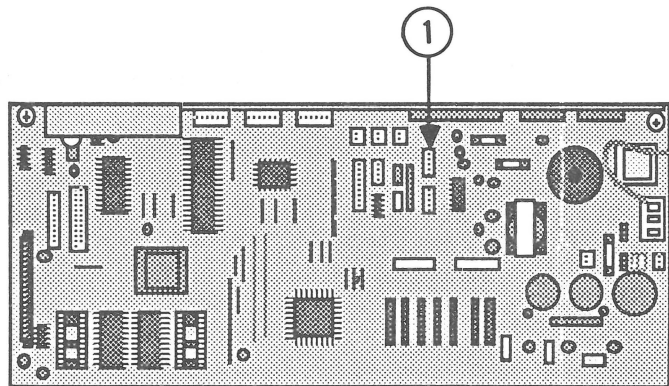
### Remove

1. Remove the main cover.



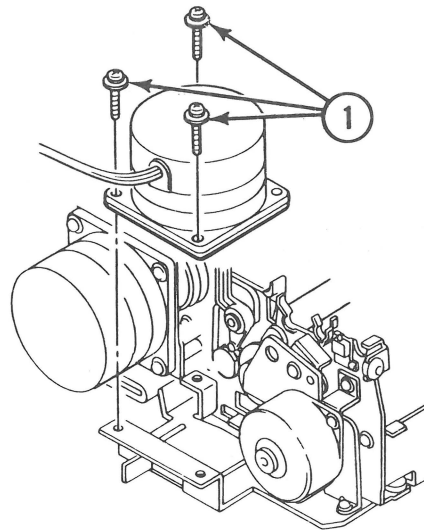
**FIGURE 41**

2. Loosen the Phillips screw that binds the ribbon gear unit in place (Figure 41, #1).
3. Remove the timing belt from the pulley on the ribbon gear unit.
4. Cut the cable ties that hold the carrier motor cable to the rest of the cables in the bundle.



**FIGURE 42**

5. Disconnect the carrier motor cable from main board connector CN5 (Figure 42, #1).



**FIGURE 43**

6. Remove the three Phillips screws that secure the carrier motor to the support plate assembly (Figure 43, #1).
7. Lift the carrier motor out of the printer.

## Replace

1. Place the carrier belt around the pulley on the ribbon gear unit.
2. Place the carrier motor and the support plate on the support plate assembly.
3. Check under the carrier motor and make sure the carrier belt is around the gear of the carrier motor. If it isn't, work it onto the gear with your forefinger.
4. Install the three Phillips screws that secure the carrier motor to the support plate assembly and tighten them.
5. Verify that the carrier assembly moves freely in both directions.
6. Attach the carrier motor cable to main board connector CN5.
7. Tighten the Phillips screw that holds the ribbon gear unit in place.

---

## ❑ AUTO-LOAD SOLENOID

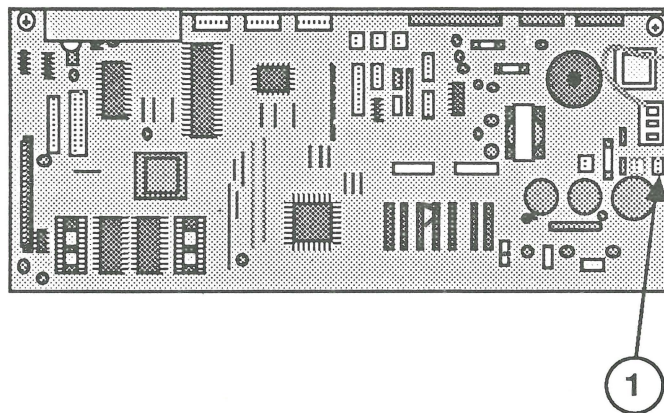
### Materials Required

#2 Phillips screwdriver  
Small, diagonal cutters

### Remove

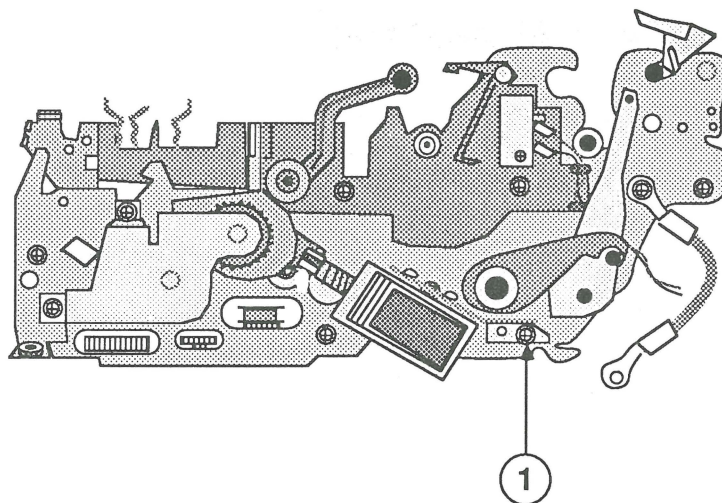
1. Remove the mechanical assembly.
2. Cut the cable ties that hold the auto-load solenoid cable to the rest of the cables in the bundle.





**FIGURE 44**

3. Disconnect the auto-load solenoid cable from main board connector CN8 (Figure 44, #1).



**FIGURE 45**

4. Remove the Phillips screw that secures the auto-load solenoid to the right-side frame (Figure 45, #1) and remove the solenoid.

**Hint:** The opening in the arm of the auto-load solenoid is slotted so you'll have to rotate the arm slightly to unhook it from the paper bail bracket.

## Replace

1. Place the auto-load solenoid in place against the right side frame and hook the arm to the paper bail bracket.

**Note:** Be sure the spring is replaced between the arm and the solenoid.

2. Replace the Phillips screw to secure the solenoid to the right-side frame.
3. Connect the auto-load solenoid cable to main board connector CN8.
4. Replace the mechanical assembly.

---

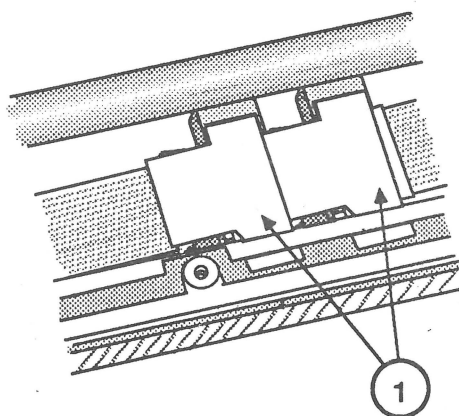
## ☐ MECHANICAL ASSEMBLY

### Materials Required

Phillips screwdriver  
Small, diagonal cutters

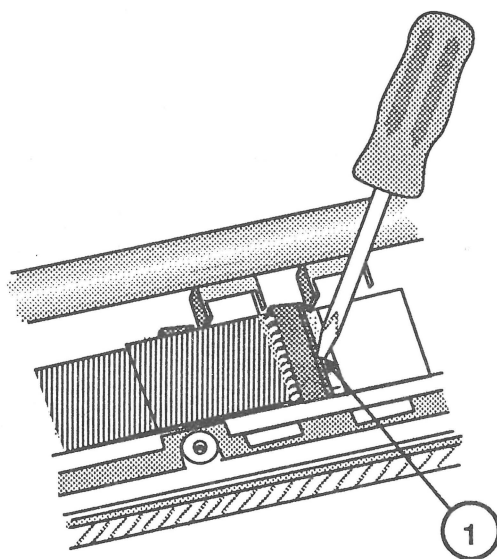
### Remove

1. Remove the main cover.
2. Slide the carrier assembly to the far left side of the printer.



**FIGURE 46**

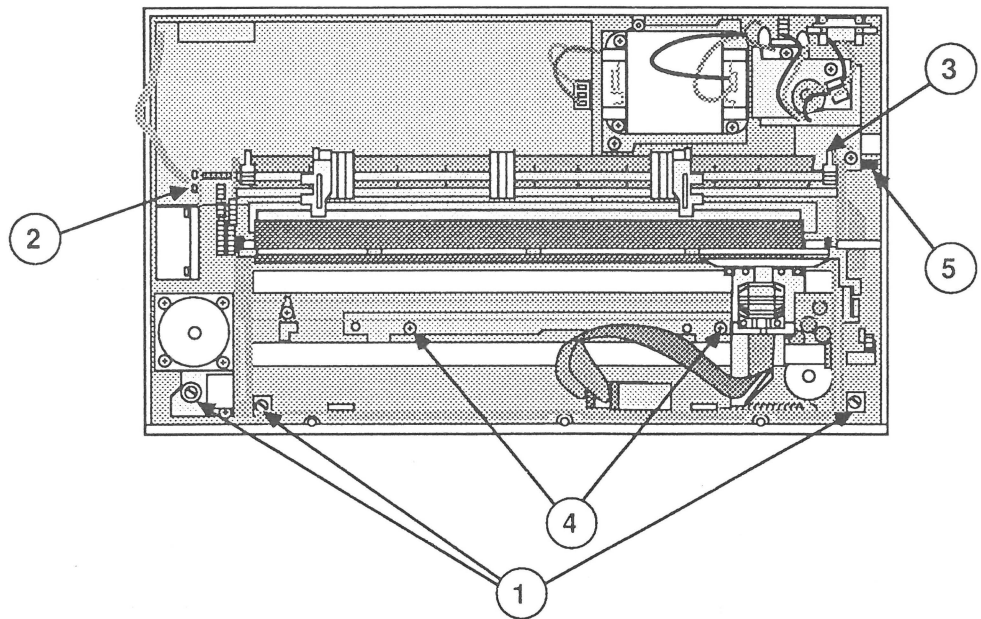
3. Remove the two flexible PCB holders (Figure 46, #1) by pulling the holder up from the center.



**FIGURE 47**

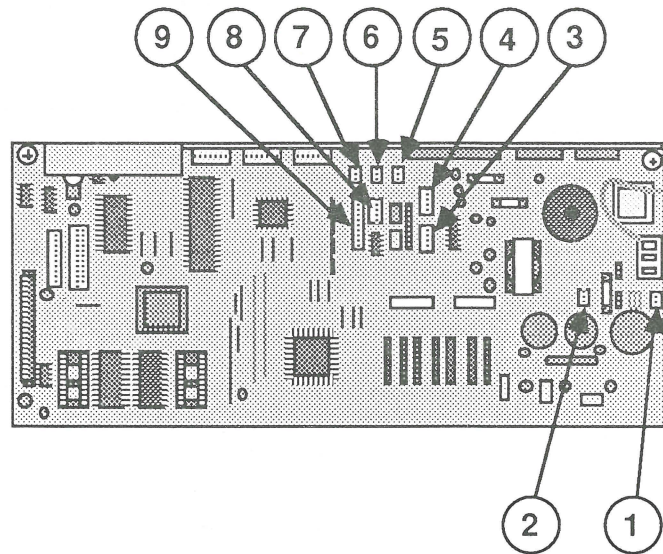
4. Place the flatblade screwdriver in the slot of the flexible relay PCB connector (Figure 47, #1). Gently rotate the screwdriver in either direction until the sliding portion moves away from the rest of the connector. Slide the cable from the connector.

5. Repeat step 4 for the other connector.



**FIGURE 48**

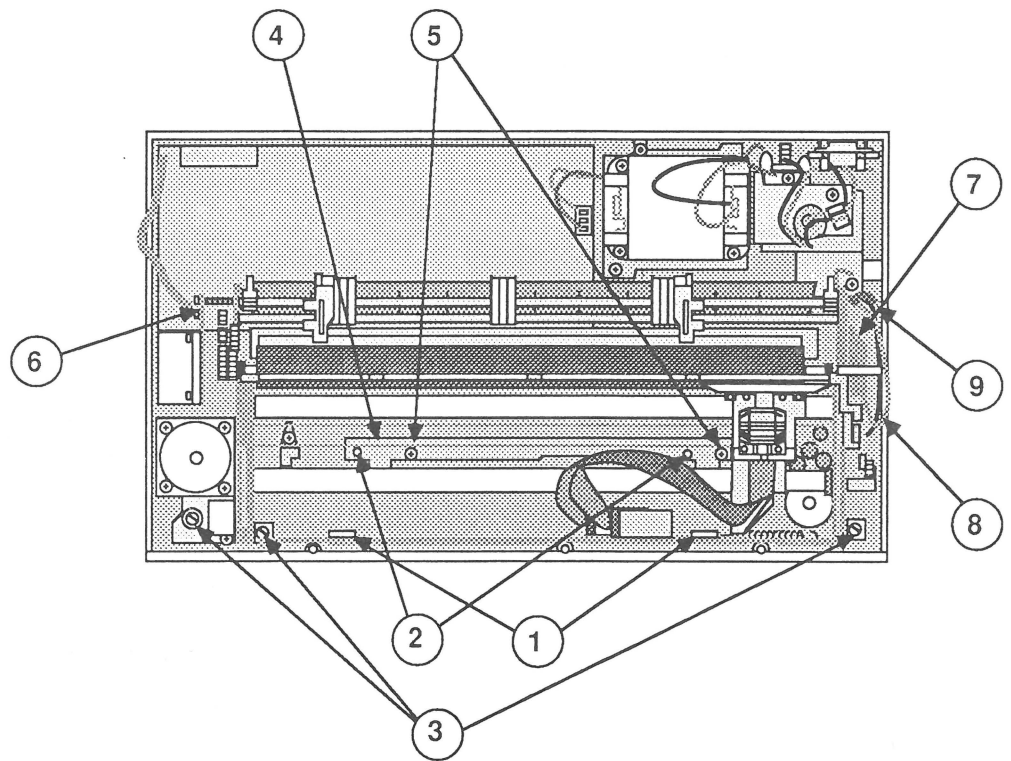
6. Loosen, but do not remove, the three screws that secures the mechanical assembly to the bottom cover (Figure 48, #1).
7. Remove the Phillips screw (Figure 48, #2) that secures the ground braid to the rear of the mechanical assembly.
8. Remove the Phillips screw (Figure 48, #3) that attaches the power supply bracket to the rear of the mechanical assembly.
9. Remove the two Phillips screws that secure the fixer bar to the mechanical assembly, if present (Figure 48, #4).
10. Open the cable clamp (Figure 48, #5) at the right rear side of the printer, and remove the cables from the clamp.



**FIGURE 49**

11. Disconnect the following cables from the main board:

- Auto-load solenoid cable from CN8 (Figure 49, #1)
- Cut sheet feeder switch cable from CN11 (Figure 49, #2)
- Carrier motor cable from CN5 (Figure 49, #3)
- Paper-out sensor cable from CN9 (Figure 49, #4)
- Paper-detect switch cable from CN12 (Figure 49, #5)
- Platen gap position sensor cable from CN18 (Figure 49, #6)
- Home position switch cable from CN10 (Figure 49, #7)
- Paper feed motor cable from CN6 (Figure 49, #8)
- Color ribbon assembly cable from CN7 (Figure 49, #9)



**FIGURE 50**

12. Use the flat-blade screwdriver to release the two plastic tabs holding the mechanical assembly to the bottom cover (Figure 50, #1). As you release the first tab, use your other hand to hold that side of the mechanical assembly above the tab, and then release the other tab.
13. **Carefully** lift the mechanical assembly from the bottom cover. Don't be afraid to use a little bit of force to pull the assembly loose.

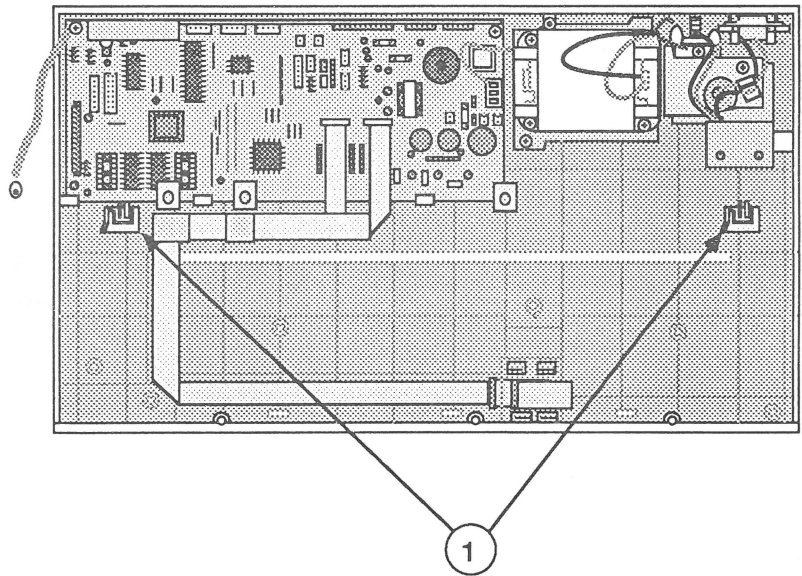
## Replace

1. Place the mechanical assembly in position in the bottom cover.

Be sure to engage the rubber feet at the rear of the mechanical assembly with the tabs in the bottom cover (Figure 51, #1).

Be sure you don't pinch any wires under the mechanical assembly.





**FIGURE 51**

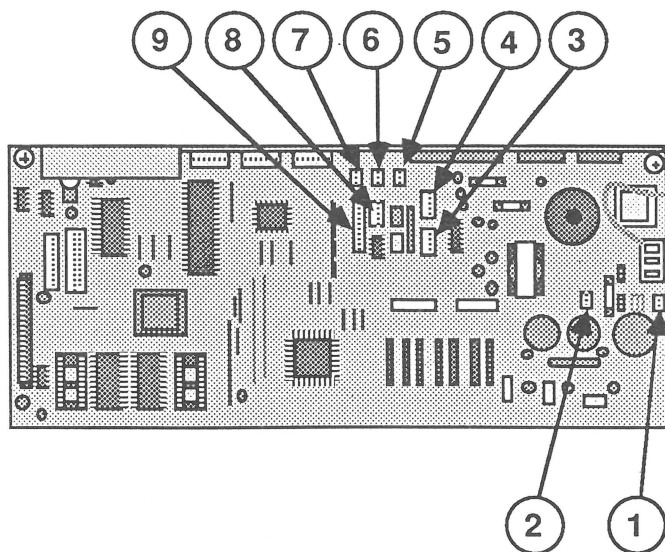
2. Press down the mechanical assembly until you hear a click.

Check the alignment posts (Figure 50, #2) to make sure the assembly is correctly positioned.

3. Tighten the three screws securing the mechanical assembly to the bottom cover (Figure 50, #3).
4. Place the fixer bar (Figure 50, #4) in position, and replace the two Phillips screws (Figure 50, #5).
5. Attach the ground braid (Figure 50, #6) to the mechanical assembly with the Phillips screw.
6. Replace the power supply bracket screw (Figure 50, #7).
7. Route the auto-load solenoid and platen gap position sensor cables (Figure 50, #8) through the cable clamp (Figure 50, #9), and close the clamp.

8. Connect the following cables to the main board:

- Auto load solenoid cable from CN8  
(Figure 52, #1)
- Cut sheet feeder switch cable from CN11  
(Figure 52, #2)
- Carrier motor cable from CN5  
(Figure 52, #3)
- Paper-out sensor cable from CN9  
(Figure 52, #4)
- Paper-detect switch cable from CN12  
(Figure 52, #5)
- Platen gap position sensor cable from CN18  
(Figure 52, #6)
- Home position switch cable from CN10  
(Figure 52, #7)
- Paper feed motor cable from CN6  
(Figure 52, #8)
- Color ribbon assembly cable from CN7  
(Figure 52, #9)



**FIGURE 52**

9. Take the print head cable with the **narrower** connector (this will be the cable on top that exits from the carrier assembly), and slide the cable into the flexible relay PCB connector on the left.
10. While holding the cable in place, press the sliding portion of the connector toward the body of the connector until it clicks into place.
11. Repeat steps 9 and 10 for the other cable, the one with the **wider** connector.
12. Replace the two flexible PCB holders.
13. Replace the main cover.

---

## □ PAPER-DETECT SWITCH

### Materials Required

Phillips screwdriver  
Small, diagonal cutters

### Remove

1. Remove the mechanical assembly.
2. Cut the cable ties that hold the paper-detect switch cable to the cables in the rest of the bundle.
3. Remove the Phillips screw that secures the paper-detect switch to the paper-guide plate.

### Replace

1. Place the paper-detect switch in position on the paper-guide plate. Make sure the tab on the guide plate is aligned with the corresponding circular opening in the switch.
2. Replace the Phillips screw that secures the switch to the paper guide plate. As you tighten the screw, make sure the switch is correctly positioned.
3. Replace the mechanical assembly.

---

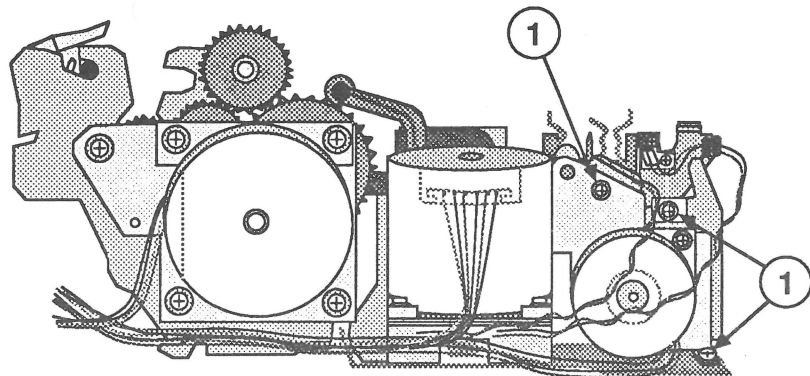
## □ COLOR RIBBON MOTOR ASSEMBLY

### Materials Required

#2 Phillips screwdriver  
Jeweler's Phillips screwdriver  
Small, diagonal cutters  
Needlenose pliers

### Remove

1. Remove the mechanical module.
2. Cut the cable ties that hold the color ribbon motor and ribbon home position switch cables to the rest of the cables in the bundle.
3. Using the needlenose pliers, rotate the rubber grommet holding the ribbon home position switch cable to the mechanical module. Rotate the grommet until the slot is even with the slot in the metal bracket.
4. Pull the home position switch cable from the grommet and bracket.

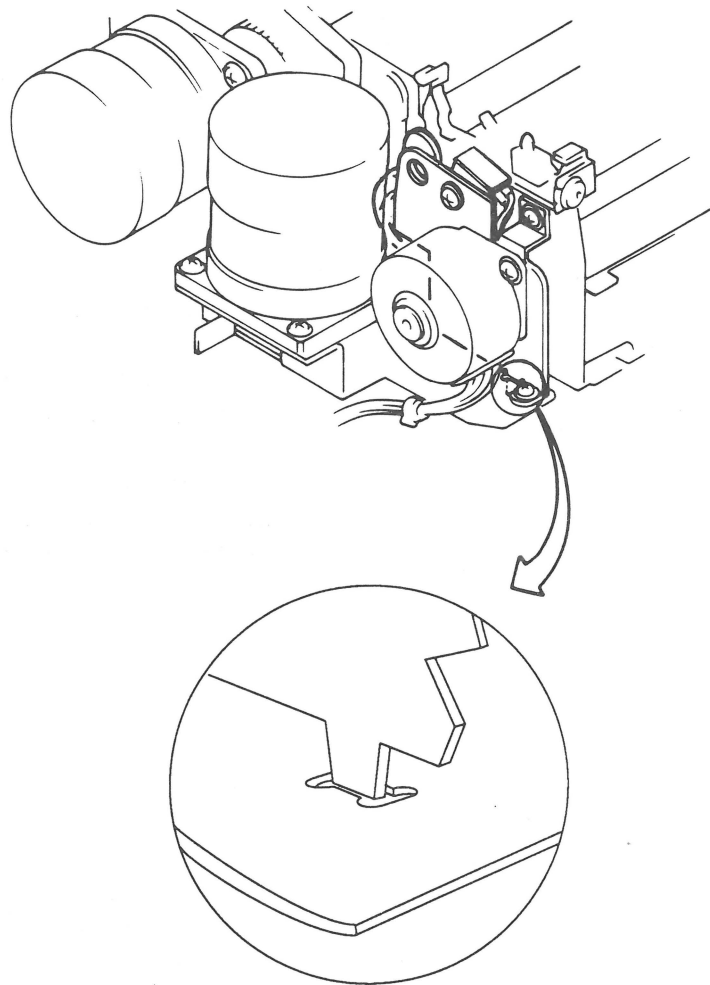


**FIGURE 53**

5. Remove the three Phillips screws that secure the color ribbon motor assembly to the mechanical module (Figure 53, #1).

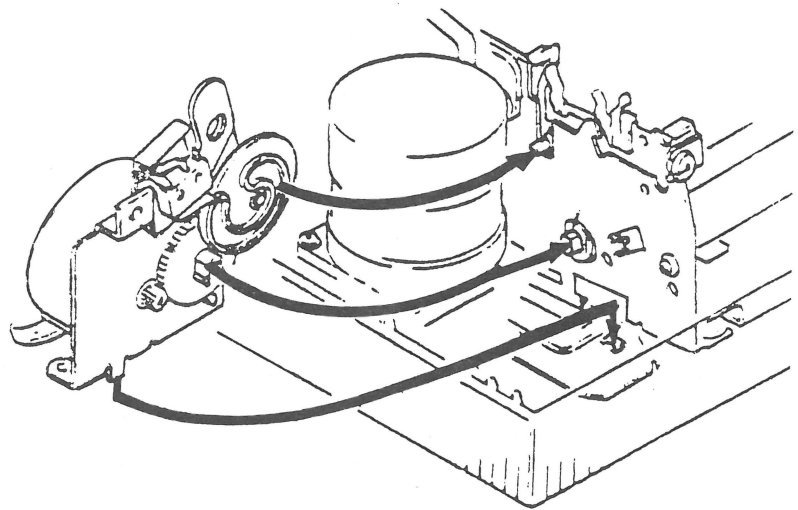
## Replace

6. Remove the color ribbon motor assembly.
1. Rotate the left shift gear so that the opening is pointing toward the bottom of the bracket.
2. Rotate the carriage shaft toward you until it stops.



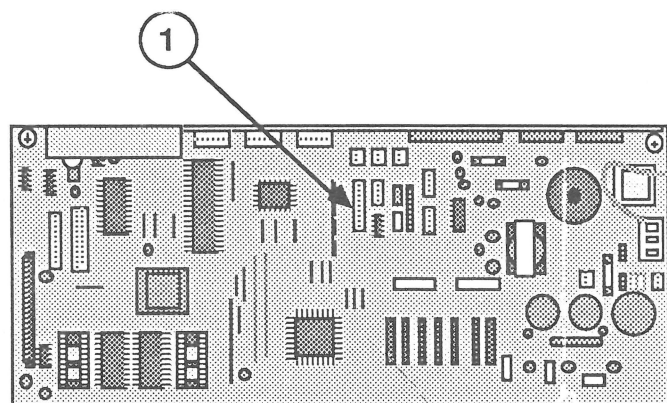
**FIGURE 54**

3. Place the ribbon motor assembly against the frame. The left shift gear should engage with the carriage shaft. Also, the projection at the base of the ribbon motor holder should be inserted into the frame (Figure 54).



**FIGURE 55**

4. Put the tab shown in Figure 55 into the groove of the left gear cam.
5. Install the two Phillips screws that attach the motor assembly to the mechanical module.
6. Attach the ribbon switch to the frame using the 2 x 6 mm screw.
7. Place the ribbon switch wire in the rubber grommet and rotate the grommet with the needlenose pliers 90 degrees in either direction.



**FIGURE 56**

8. Connect the ribbon motor and switch cable to connector CN7 on the main board (Figure 56, #1).
9. Replace the mechanical module.



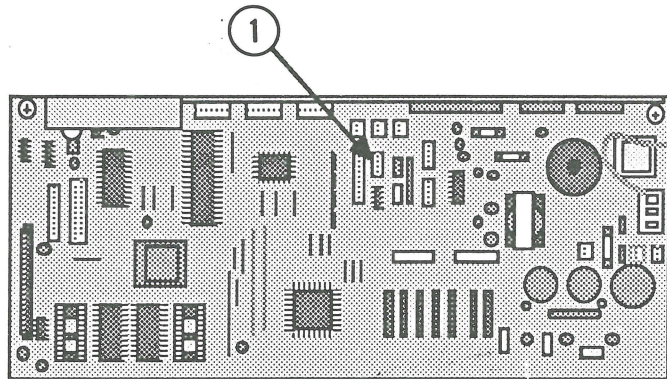
## □ PAPER FEED MOTOR

### Materials Required

#2 Phillips screwdriver  
Small, diagonal cutters

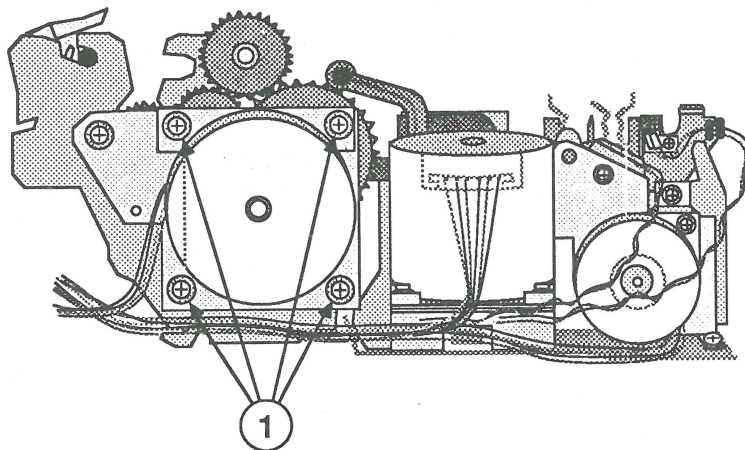
### Remove

1. Remove the mechanical module.
2. Cut the cable ties that hold the paper feed motor cable to the rest of the cables in the bundle.



**FIGURE 57**

3. Disconnect the paper feed motor cable from main board connector CN6 (Figure 57, #1).



**FIGURE 58**

4. Remove the four Phillips screws that secure the paper feed motor to the paper feed motor bracket (Figure 58, #1). Remove the paper feed motor.

## Replace

1. Place the paper feed motor in position against the paper feed motor bracket. Orient the motor so that the wires exit towards the rear of the printer.

**Note:** Hold the paper feed motor in position and rotate the platen back and forth, and make sure no binding occurs between the paper feed motor gear and the other gears in the gear train.

2. Replace the four Phillips screws that hold the paper feed motor to its bracket. (The longer screws are used on the bottom of the motor.)
3. Connect the paper feed motor cable to main board connector CN6.
4. Replace the mechanical module.

---

## □ GEAR LINKAGE ASSEMBLY

### Materials Required

#2 Phillips screwdriver  
Grip-ring pliers or small, flatblade screwdriver

## Remove

1. Remove the mechanical assembly.

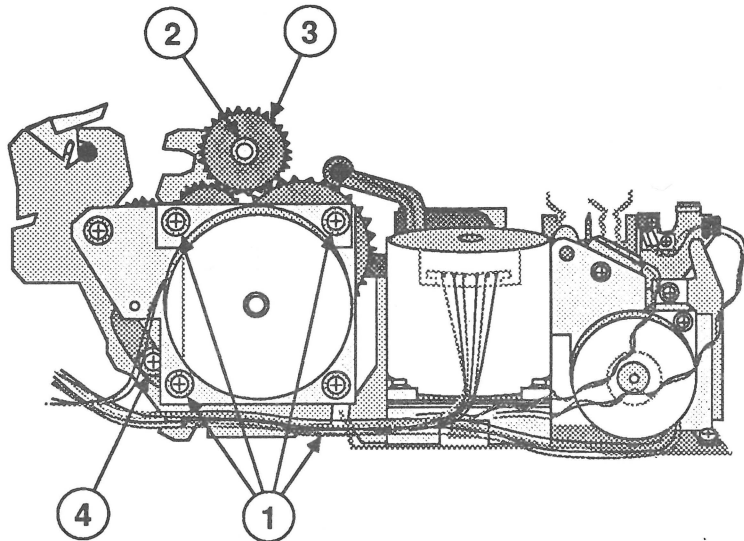


FIGURE 59

2. Remove the four Phillips screws securing the paper feed motor and bracket to the mechanical assembly (Figure 59, #1). Set the motor on the work surface next to the mechanical assembly.
3. Using the grip-ring pliers or the small screwdriver, remove the E-ring (Figure 59, #2) securing the idler gear (Figure 59, #3) and the upper portion of the gear linkage assembly to the upper post on the mechanical assembly. Remove the idler gear.
4. Remove the Phillips screw securing the lower portion of the gear linkage assembly to the release lever shaft (Figure 59, #4).
5. Use the flatblade screwdriver to gently pry the lower portion of the gear linkage assembly from the release lever shaft. The fit is quite tight, so don't be afraid to use a **little** extra force to separate the two.
6. Remove the gear linkage assembly.

## Replace

1. Align the opening in the lower portion of the gear linkage assembly with the release lever shaft.
2. Place the opening on the upper portion of the gear linkage assembly on the post on the mechanical assembly.
3. Replace the idler gear on the upper post.
4. Snap the E-ring into place to hold the idler gear and the gear linkage assembly to the upper post.
5. Replace the Phillips screw at the lower portion of the gear linkage assembly.
6. Put the paper feed motor and bracket into position, and replace the three Phillips screws. (The two longer screws are used on the bottom of the motor.)
7. Replace the mechanical assembly.

---

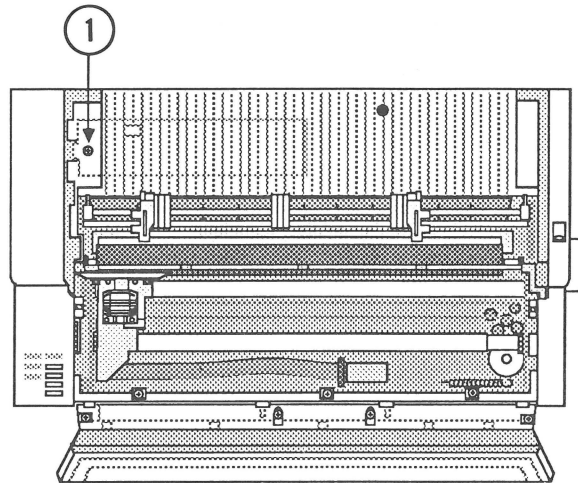
## ❑ OPTION CARD

### Materials Required

#2 Phillips screwdriver

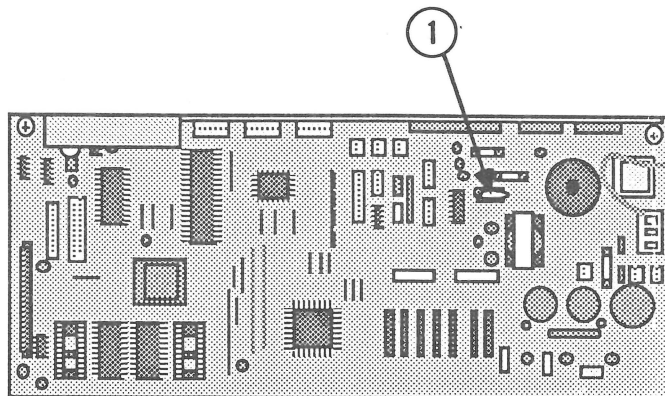
### Remove

1. Open the front and rear covers.



**FIGURE 60**

2. Remove the Phillips screw that secures the option card cover to the main cover (Figure 60, #1). Remove the option card cover.
3. Carefully, lift the option card straight up from its mating connector. DO NOT try to remove the card fully from the printer yet.



**FIGURE 61**

4. Disconnect the ground wire for the metal lug on the main board (Figure 61, #1).
5. Remove the card from the printer.

## **Replace**

1. Locate the metal lug on the main board and attach the ground wire.
2. Hold the card on the right side, with the component side down, and lower the card onto the plastic support post.
3. Press the left side of the card down firmly to fasten the card's connector to the printer's connector.
4. Replace the option card cover and its Phillips screw.

🍏 Apple Technical Procedures

# ImageWriter LQ

## Section 3 – Adjustments

---

### ❑ CONTENTS

- 3.3 Print Head Gap
- 3.6 Platen Gap and Parallelism
- 3.10 Card Guide
- 3.12 Color Ribbon Home Position
- 3.14 Color Ribbon Parallelism
- 3.16 Horizontal Registration
- 3.18 Home Position Switch

**Note:** If a step is underlined, detailed instructions for that step can be found in Section 2, Take-Apart.



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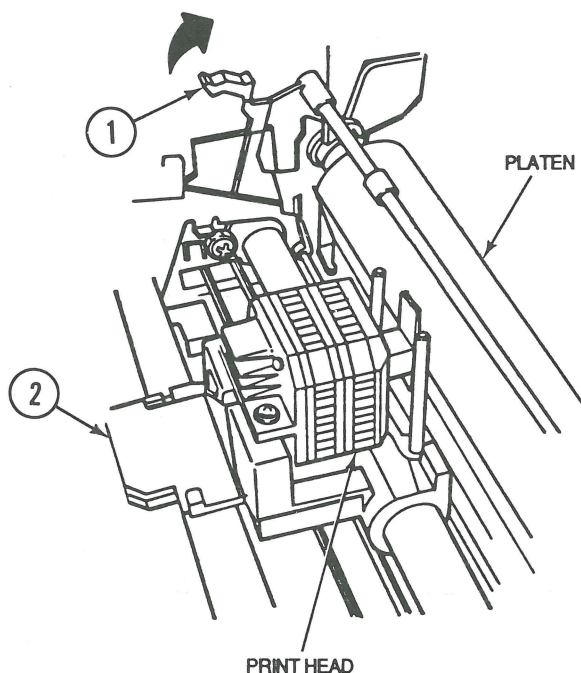
## □ PRINT HEAD GAP

### Materials Required

*Macintosh Peripheral Tests* disk  
#2 Phillips screwdriver  
Metric thickness gauge

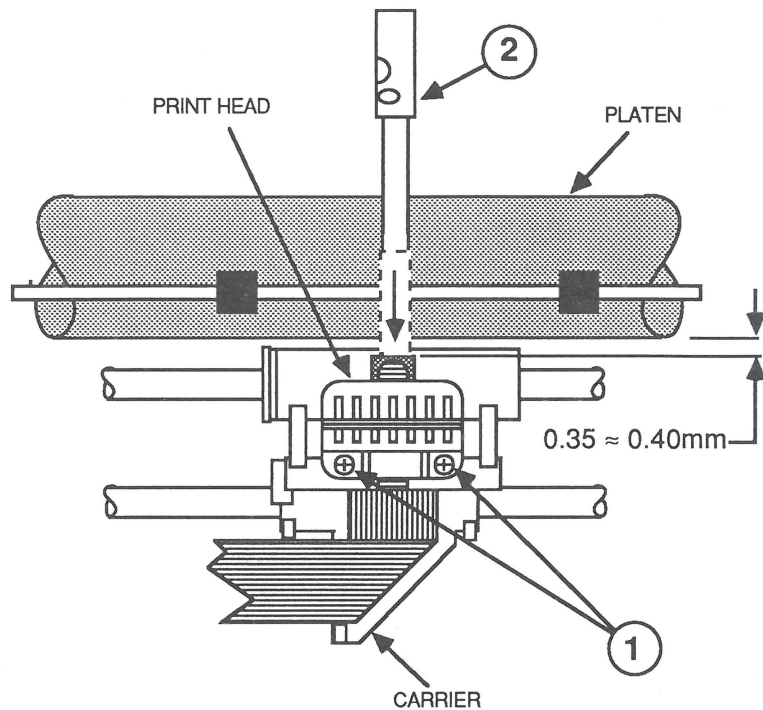
### Procedure

1. Using the *Macintosh Peripheral Tests* disk, perform "Print Test—Wide." (Refer to Section 5, Diagnostics.)
2. Be sure the power is off.
3. Remove the ribbon cartridge. (Refer to Section 1, Basics.)
4. Remove the card guide.



**FIGURE 1**

5. Check to see that the paper thickness lever (Figure 1, #1) is pushed all the way toward the back of the printer, to the number-one position.
6. Move the carrier assembly to the center of the printer (Figure 1, #2).



**FIGURE 2**

7. Loosen the two screws that secure the print head (Figure 2, #1).

**Note:** Be careful not to lean on the front cover.

8. Adjust the gap by moving the print head forward or backward so that a thickness gauge of 0.35 mm (Figure 2, #2) can be inserted between the print head and platen, and a 0.4 mm gauge cannot.

The print head is properly adjusted when a 0.35 mm gauge can be inserted without any resistance and a 0.4 mm gauge drags slightly.

**Note:** Ensure that the print head is parallel to the platen and that the carrier assembly is not lifted up during measurement.

**If you are unable to obtain a proper adjustment,** complete step 9, skip steps 10 through 13, and proceed to the "Platen Gap and Parallelism" adjustment.

9. Tighten both screws securing the print head.
10. Check the gap at the extreme right and extreme left of the platen.
11. Rotate the platen a half-revolution and recheck the gap at the center, extreme right, and extreme left.

**If the gap does not stay in adjustment across the platen**, skip steps 12 and 13 and proceed to the "Platen Gap and Parallelism" adjustment.

12. Replace the card guide.

**Note:** When installing the card guide, be sure to perform the "Card Guide" adjustment.

13. Replace the ribbon cartridge.

---

## □ PLATEN GAP AND PARALLELISM

### Materials Required

#2 Phillips screwdriver  
8 mm, Open-end wrench  
Metric thickness gauge

### Procedure

1. Perform the "Print Head Gap" adjustment.
2. Be sure the power is off.
3. Remove the ribbon cartridge. (Refer to Section 1, Basics.)
4. Remove the card guide.
5. Push the paper thickness lever (Figure 3, #1) toward the back of the printer, to the number-one position.
6. Loosen the eccentric roller set screws on both the left (Figure 3, #2) and right sides of the printer.

**Note:** Be careful not to lean on the front cover.

7. Adjust the gap, with the carrier assembly at the extreme left of the platen, by turning the hexagon-shaped nut on the left eccentric roller (Figure 3, #3) and then on the right eccentric roller.
  - a) You should be able to insert a 0.35 mm thickness gauge (Figure 3, #4), but not a 0.4 mm gauge, between the print head and the platen.
  - b) The print head is properly adjusted when a 0.35 mm gauge can be inserted without any resistance and a 0.4 mm gauge drags slightly.

**Note:** Be careful not to lift up on the carrier assembly during measurement.

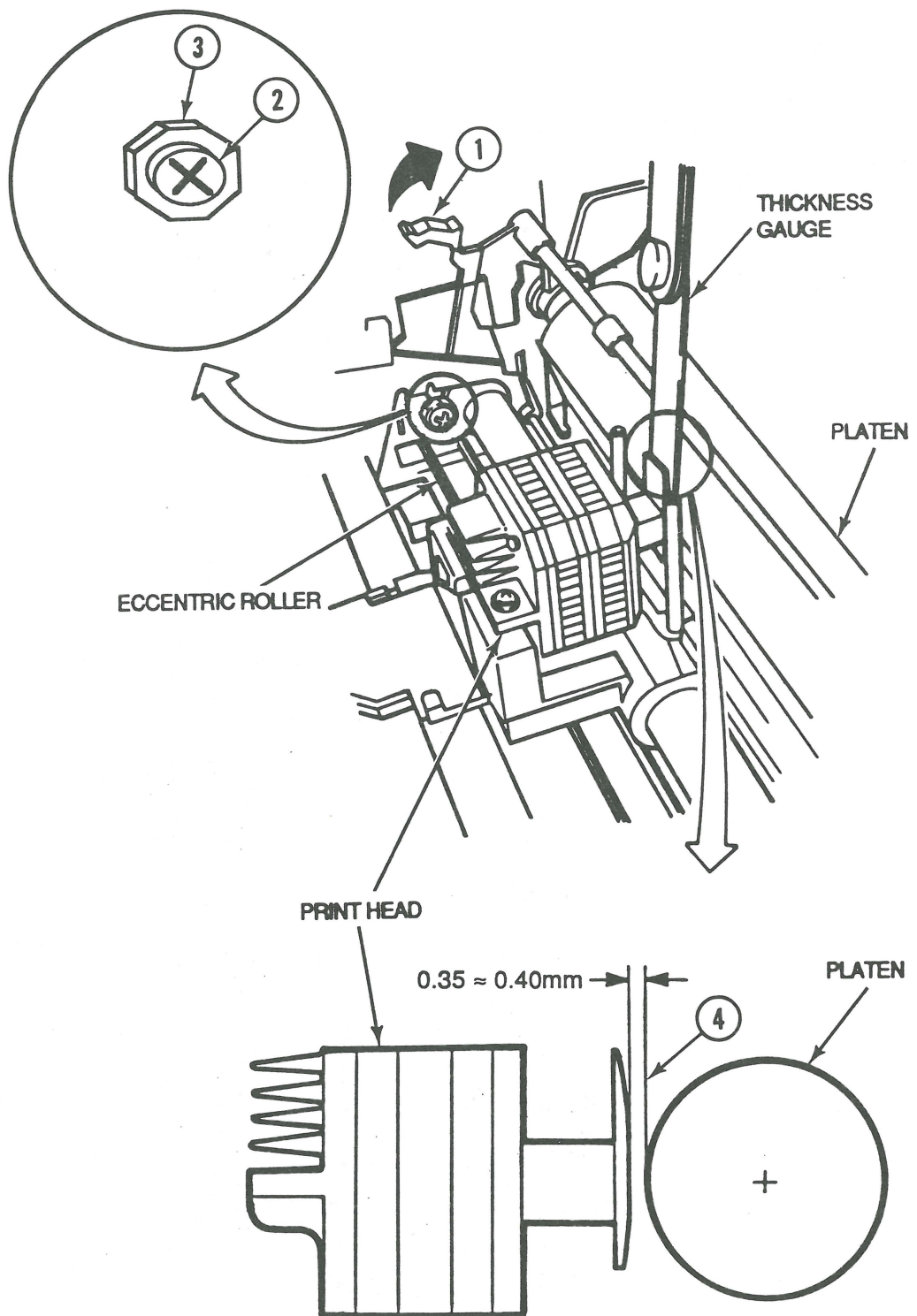


FIGURE 3

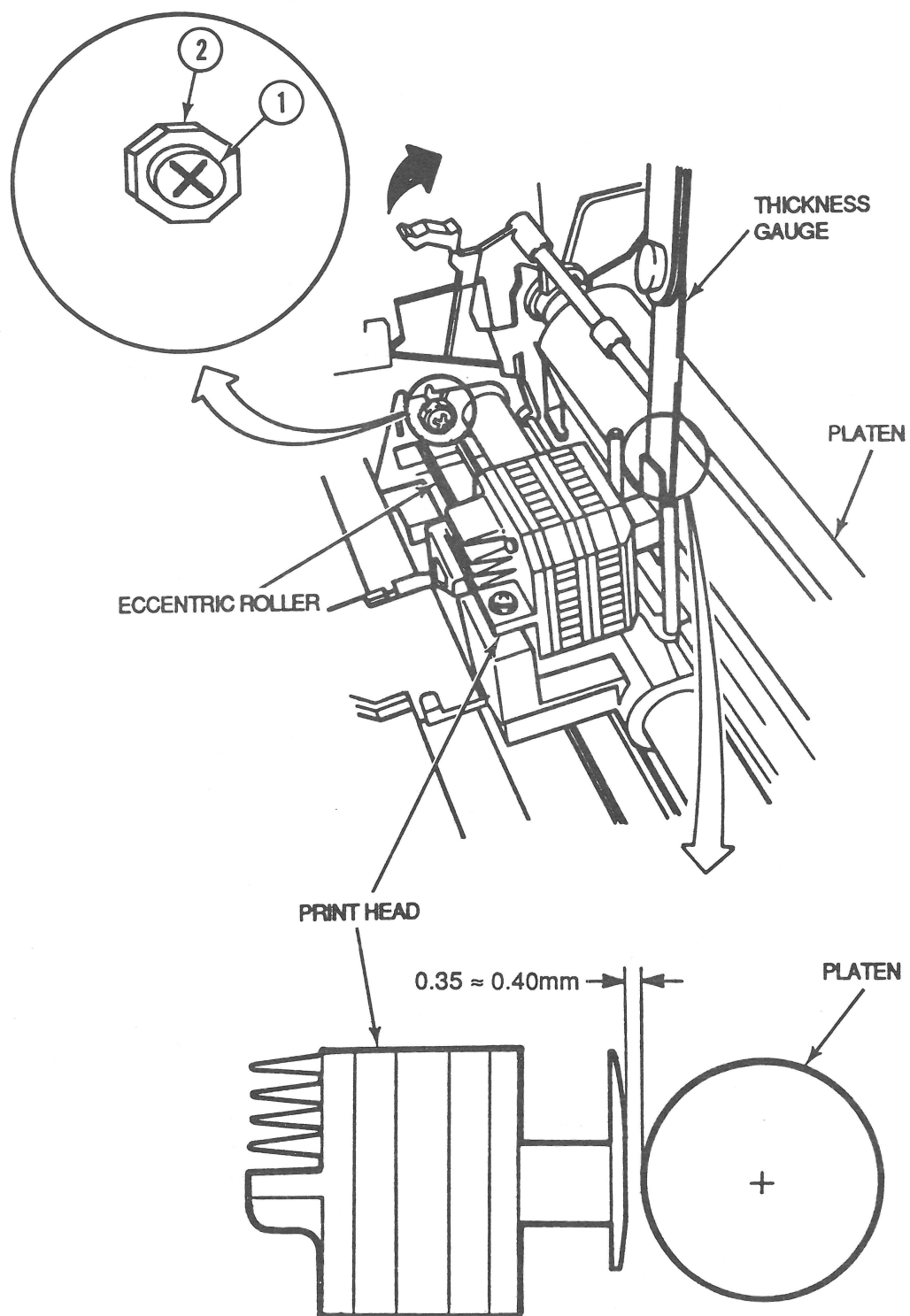


FIGURE 4



8. Move the carrier to the extreme right and adjust the gap as in step 7.
9. Move the carrier to the center and repeat step 7.
10. Tighten the eccentric roller set screws (Figure 4, #1) on both the left and right sides of the printer while holding the hexagon nut (Figure 4, #2) with the wrench.
11. Check the gap at the extreme left, extreme right, and center of the printer. If all three checkpoints are not in adjustment, repeat steps 6 through 10 until they are.
12. Rotate the platen a half-revolution and check the gap at the left, right, and center of the printer. If all three checkpoints are not in adjustment, repeat steps 6 through 11 until they are.
13. Replace the card guide.

**Note:** When installing the card guide, be sure to perform the "Card Guide" adjustment.

14. Replace the ribbon cartridge.

---

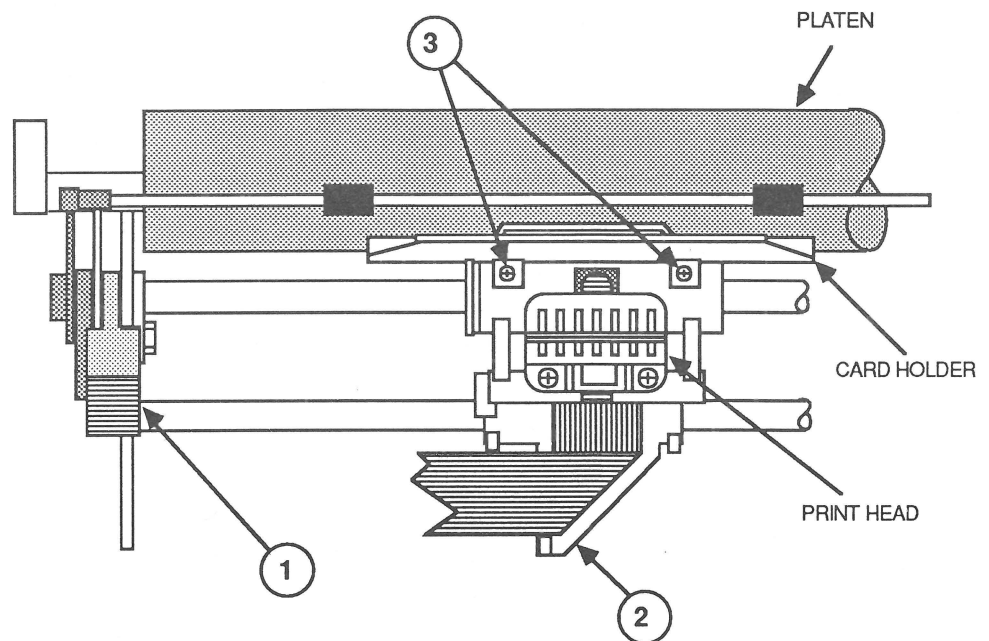
## □ CARD GUIDE

### Materials Required

- #1 Phillips screwdriver
- 1 sheet of 24-lb. paper

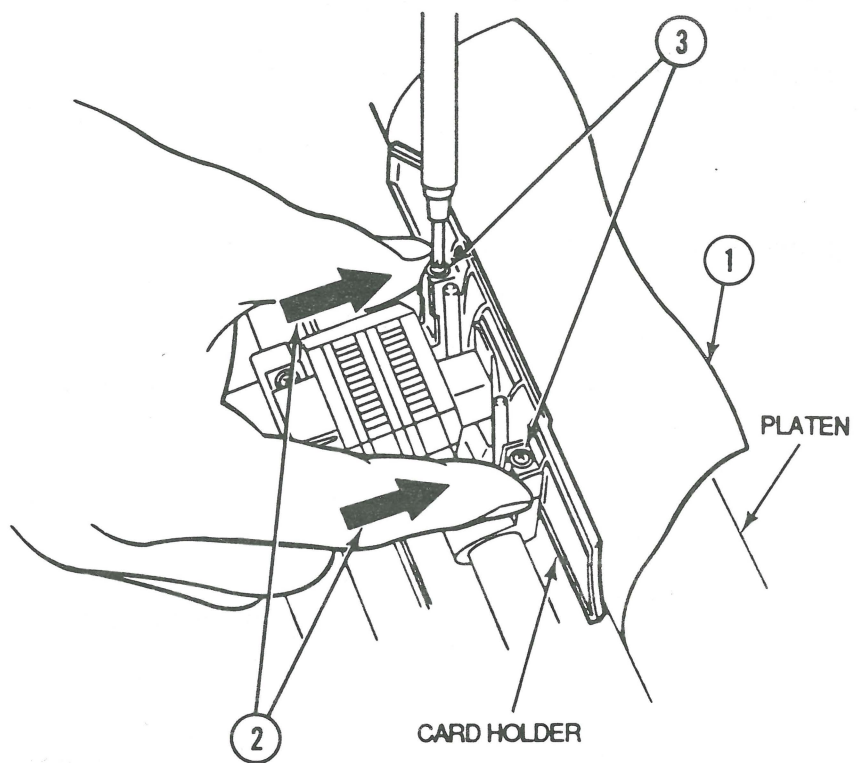
### Procedure

1. Push the paper thickness lever (Figure 5, #1) toward the back of the printer, to the number-one position.



**FIGURE 5**

2. Be sure the power is off.
3. Move the carrier assembly to the center of the printer (Figure 5, #2).
4. Loosen the two card guide set screws (Figure 5, #3).



**FIGURE 6**

5. Roll the sheet of paper between the card guide and the platen (see Figure 6, #1).
6. Gently push forward on the card guide until it stops against the paper (see Figure 6, #2).
7. Tighten the two card guide set screws (Figure 6, #3) while holding the card guide in position.

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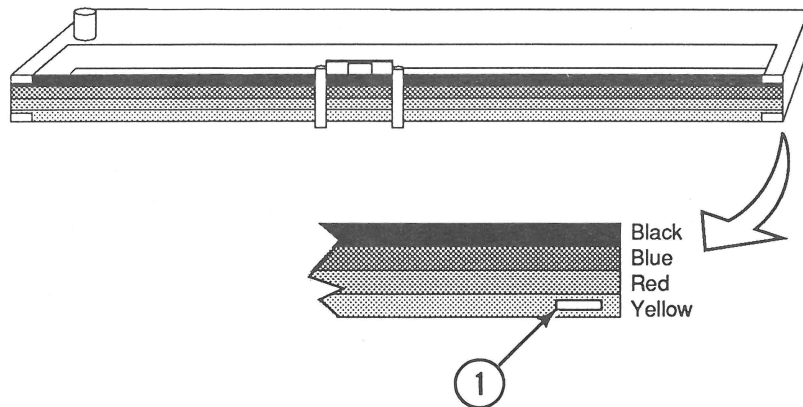
## □ COLOR RIBBON HOME POSITION

### Materials Required

*Macintosh Peripheral Tests* disk  
#2 Phillips screwdriver  
DIP switch setter

### Procedure

1. Using the *Macintosh Peripheral Tests* disk, perform "Print Test—Wide." (Refer to Section 5, Diagnostics.)
2. Be sure the power is off.



**FIGURE 7**

3. Compare your printout with the color sequence of the ribbon to determine whether the printer is printing above or below the center of the color bands (Figure 7, #1).

4. Adjust the print position to the center of the color bands by changing the DIP switch settings one at a time.

When the print position is **above the center** of the color bands, refer to Table 1. When the print position is **below the center** of the color bands, refer to Table 2.

Print position is above center of color bands			
DIP 3-3	DIP 3-4	DIP 3-5	Amount of down- ward movement (mm)
On	On	Off	0.78125
Off	On	Off	0.46875
On	Off	Off	0.15625

TABLE 1

Print position is below center of color bands			
DIP 3-3	DIP 3-4	DIP 3-5	Amount of upward movement (mm)
On	Off	On	0.15625
Off	On	On	0.46875
On	On	On	0.78125

TABLE 2

5. Repeat steps 1 through 4 until the print position is in the center of the color bands.

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## □ COLOR RIBBON PARALLELISM

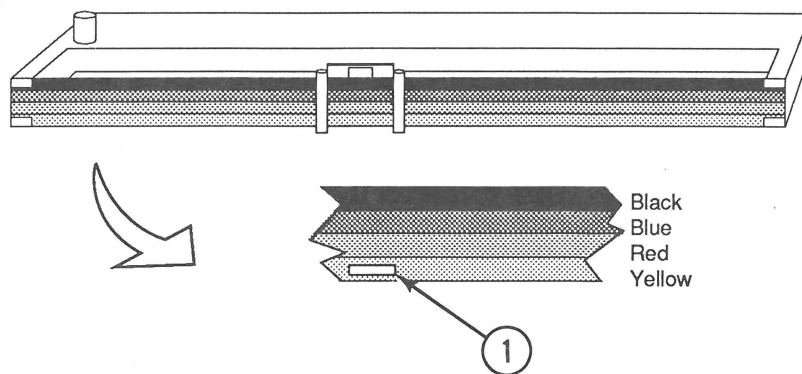
### Materials Required

*Macintosh Peripheral Tests* disk  
#2 Phillips screwdriver

### Procedure

**Note:** The "Color Ribbon Home Position" adjustment must be made **before** completing this adjustment.

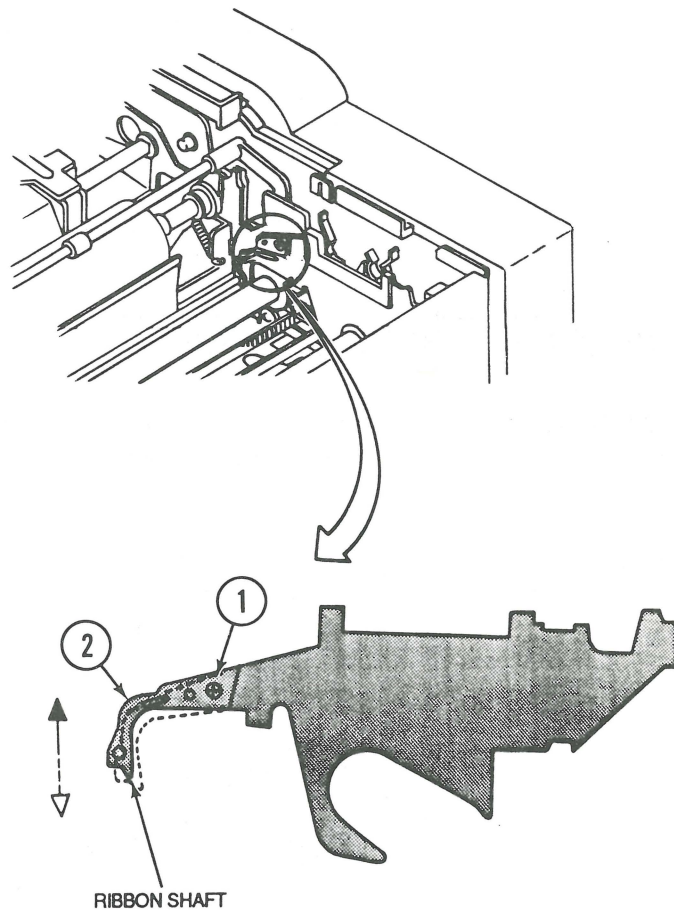
1. Be sure the power is off.



**FIGURE 8**

2. Compare your printout with the color sequence of the ribbon to determine whether the printer is printing above or below the center of the color bands (Figure 8, #1).
3. Remove the ribbon cartridge. (Refer to Section 1, Basics.)





**FIGURE 9**

4. Loosen the set screw (Figure 9, #1) on the ribbon shaft holder.
5. Adjust the print position by slightly moving the ribbon shaft holder up or down (Figure 9, #2).

When the print position is **above the center** of the color bands, move the holder upward. When the print position is **below the center** of the color bands, move the holder downward.

6. Tighten the set screw on the ribbon shaft holder.
7. Replace the ribbon cartridge.

8. Using the *Macintosh Peripheral Tests* disk, perform "Print Test—Wide." (Refer to Section 5, Diagnostics.)
9. Repeat steps 2 through 8 until the print position is centered.

---

## □ HORIZONTAL REGISTRATION

### Materials Required

*Macintosh Peripheral Tests* disk  
DIP switch setter

### Procedure

1. Using the *Macintosh Peripheral Tests* disk, perform the "Horizontal Registration" test. (Refer to Section 5, Diagnostics.)
2. Be sure the power is off.
3. Check the printout and determine which set of lines provides the best horizontal registration. The best horizontal position produces the straightest set of lines.

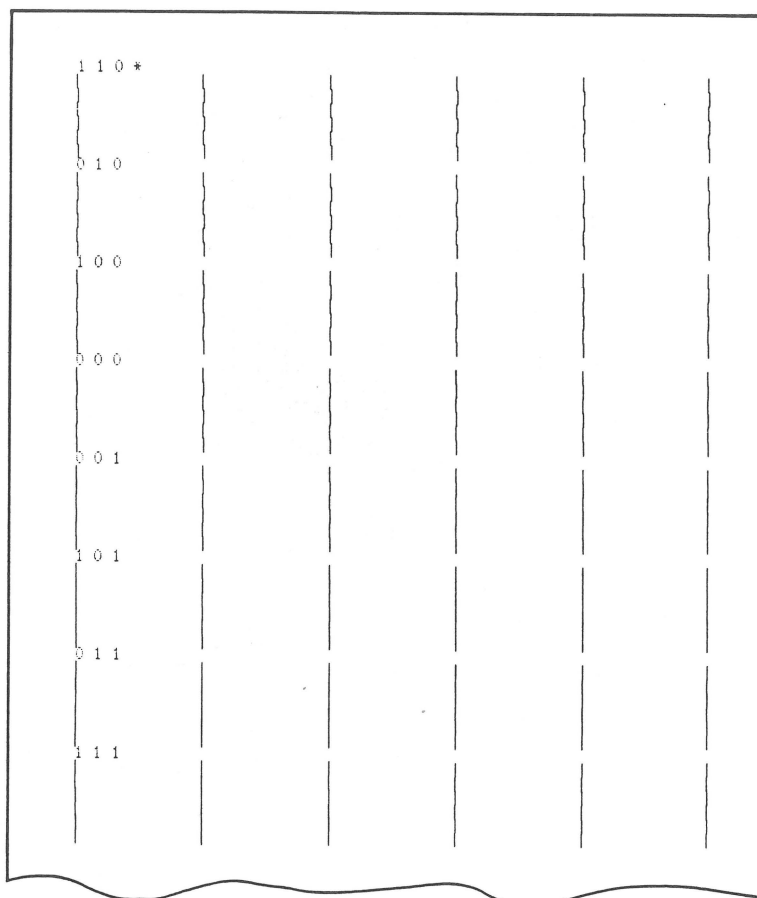
Using Tables 3 and 4, and Figure 10, set DIP switches 3-6, 3-7, and 3-8 according to the best registration selected on the printout. (1 = On; 0 = Off.)

DIP Sw 3-6	DIP Sw 3-7	DIP Sw 3-8	Amount of left movement (mm)
On	On	Off	+ 0.159
Off	On	Off	+ 0.106
On	Off	Off	+ 0.053
Off	Off	Off	+ 0.000

**TABLE 3**  
**LEFT MOVEMENT**

DIP Sw 3-6	DIP Sw 3-7	DIP Sw 3-8	Amount of right movement (mm)
Off	Off	On	- 0 . 0 4 4
On	Off	On	- 0 . 0 8 8
Off	On	On	- 0 . 1 3 2
On	On	On	- 0 . 1 7 6

**TABLE 4**  
**RIGHT MOVEMENT**



**FIGURE 10**

---

## □ HOME POSITION SWITCH

### Materials Required

*Macintosh Peripheral Tests* disk  
#2 Phillips screwdriver

### Procedure

1. Using the *Macintosh Peripheral Tests* disk, perform the "Horizontal Registration" test. (Refer to Section 5, Diagnostics.)
2. Be sure the power is off.
3. Move the print head to the right side of the platen.

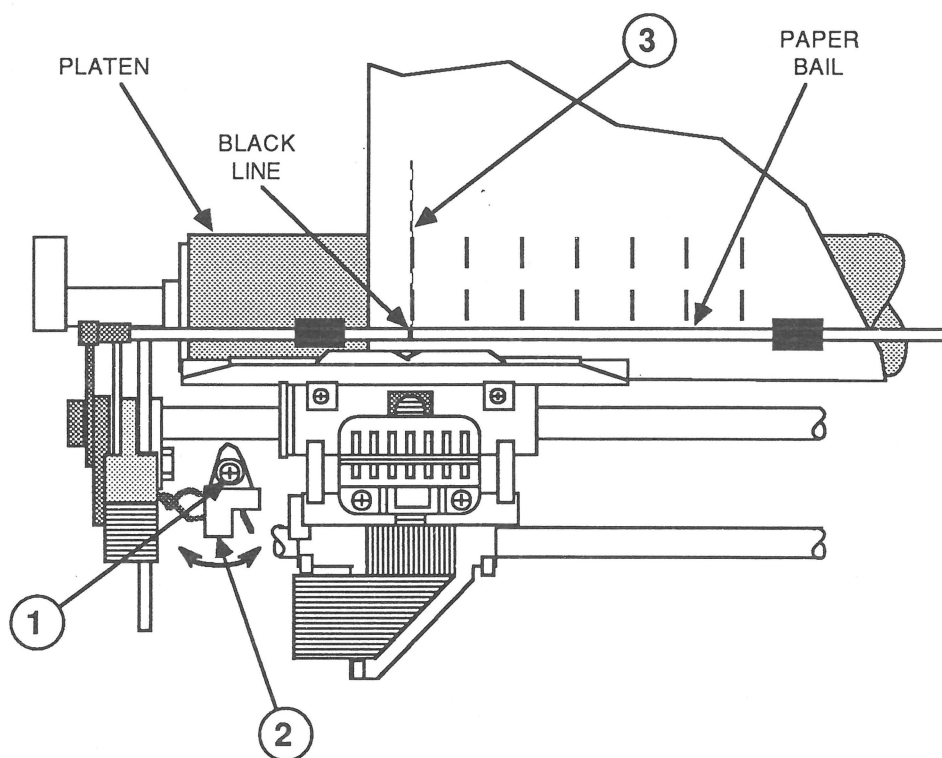


FIGURE 11

4. Loosen the screw (Figure 11, #1) securing the home position switch (Figure 11, #2).

5. Reload your printout into the printer.

**Note:** Be sure the left edge of the sheet of paper aligns with the **red** line on the paper bail.

6. Check the alignment of the first vertical line (print home position) of the printout (Figure 11, #3) with the **black** line on the paper bail.

When the print is to the **right of the black line**, move the home position switch left. When the print is to the **left of the black line**, move the home position switch right.

7. Tighten the screw (Figure 11, #1) securing the home position switch (Figure 11, #2).
8. Repeat steps 1 through 7 until the print home position is aligned.

# ImageWriter LQ

## Section 4 – Troubleshooting

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### □ CONTENTS

4.3	Introduction
4.3	Before You Start
4.3	How to Use the Symptom/Cure Chart
4.4	Preliminary Checks
4.4	Printer
4.7	Cut Sheet Feeder
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4.9	Power Problems
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**Note:** If a step is underlined, detailed instructions for that step can be found in Section 2, Take-Apart.

---

## **□ INTRODUCTION**

### **Before You Start**

Read the section titled "Preliminary Checks" before you begin troubleshooting. Items listed here do not require any disassembly, tools, or special setups and can save you time and your customer money when troubleshooting the ImageWriter LQ.

If the suggestions in "Preliminary Checks" do not correct the problem, proceed to the appropriate symptom/cure chart.

### **How to Use the Symptom/ Cure Chart**

First locate the symptom that comes closest to describing the problem; then perform the first corrective action on the solution list. If that corrective action does not fix the problem, proceed to the next action. If you replace a module and find that the problem remains, reinstall the original module before proceeding.

If a step asks you to test something, the procedure can be located elsewhere in this section.

If a tested component is defective, replace it. If it is not defective, proceed to the next action listed.



---

## ❑ PRELIMINARY CHECKS

The following chart lists common problems that have simple solutions. Checking for these problems when you begin troubleshooting can save you time and effort.

### Printer

- *Power light off,  
no carrier movement*
  - 1. Try another electrical outlet.
  - 2. International units only: Verify the setting of the voltage selector switch.
  - 3. Replace the power cord.
- *Error light blinks*
  - Close the front cover.
- *Error light on,  
Select light off*
  - No paper or improperly inserted paper.
- *No printing*
  - 1. Make sure the printer is selected.
  - 2. Verify that the interface connections to the printer are secure.
  - 3. Verify the DIP switch settings using the list in Section 1, Basics.
- *Garbled printing*
  - 1. Verify the DIP switch settings using the list in Section 1, Basics.
  - 2. Verify that the interface connections to the printer are secure.
- *Software-specific  
problem*
  - Try using a known-good piece of software.
- *No communication  
with option card  
installed*
  - Verify that DIP switch 2 position 4 is set to **ON**.
- *Paper feed difficulties:  
binding, tearing, etc.*
  - 1. Verify the setting of the paper thickness lever.
  - 2. Check and, if necessary, clear the paper path.

- *Torn paper*
  1. Verify the setting of the paper thickness lever.
  2. Verify that the paper-feed lever is set to the type of paper being used.
  3. Verify that the paper is correctly installed and, if using tractor feed paper, that the sprocket holes are properly engaged on the tractor sprockets.
  
- *Printing too light*
  1. Verify the setting of the paper thickness lever.
  2. Replace the ribbon.
  
- *Printing too dark*
  - Verify the setting of the paper thickness lever.
  
- *Carrier strikes the right-side frame when printing on 4-part carbonless forms or printing on the perforated edge of tractor-feed paper*
  1. If 4-part carbonless forms are being used, make sure they are within specifications. (Maximum thickness is 0.55 millimeters.)
  2. Be sure the paper is properly aligned.
  3. Verify the paper thickness lever is in the correct position.
  
- *Uneven print pattern on self-test (four lines light–three lines dark)*
  - The printer is sensing a color ribbon carriage. Make sure the black ribbon carriage is pressed down completely on the left side to activate the ribbon microswitch.
  
- *Printing less than best quality*
  - To get the best quality output when printing from a Macintosh, the system file must have the correct fonts. Be sure the system has fonts in the same size as the desired output ("1X" font) as well as its 3-times equivalent ("3X" font). For example, if your document is in Times 12 point, you must have both Times 12 and Times 36 installed in your system file for highest quality output. If the 3X font is absent, the output will be scaled from an available font, and there will be some loss in print quality.

- *Printing has squashed lines; misregistration problems when using pin feed paper*

1. For the best print quality, instruct the customer to use the pull tractor and the bottom feed slot. The paper should be stacked at least 12 inches below the printer. The straightness of this paper path combined with the pull tractor helps to keep the paper securely around the platen. This paper path is strongly recommended for printing labels or multipart forms.
2. If the unit does not have a slotted table, instruct the user to be sure that the power cord or printer cable does not obstruct the paper path, and to avoid printing in the top and bottom one inch of the paper (the areas where the squashed line and misregistration problems will be the most apparent).

- *Problems using labels or multipart forms*

- Instruct the customer to use the bottom feed slot, and the pull tractor for the highest quality output, and to avoid backing out paper, especially labels and forms. (Backing out labels onto the push tractor may cause labels to peel off onto the platen or may dislodge a mylar guide inside the printer.) Cut the paper at a perforation, and advance the paper forward to remove pinfeed paper from the printer.

- *Printing on the platen or over a perforation when using the push tractor*

- When printing from a Macintosh and using the push tractor, set dip switch 2-8 ON to load paper beneath the bail (about 1 inch beyond the print line). This eliminates the possibility of printing on the platen or over a perforation when the printer driver executes its reverse linefeeds at the start of a print job.

DIP switch 2-8 controls how far the paper is loaded into the printer. The default setting brings the paper up to the first printable line when you do an automatic paper feed with paper loaded on the push tractor.

- *Words touching or slightly overlapping*
  - If the printer is being used with a Macintosh, update to version 2.0 or greater of the LQ driver.
- *Page setup problems between different printers*
  - If the customer notices a format difference in the document when printing from an ImageWriter LQ, and then from a LaserWriter, inform the customer that he must use Page Setup from the File menu each time a different kind of printer is used. Since the ImageWriter LQ and LaserWriter have different imageable areas (the ImageWriter page size is slightly larger than that on the LaserWriter), Page Setup is necessary to reformat the document for ImageWriter LQ printing.

### **Cut Sheet Feeder**

- *No access to second or third bin*
  - Make sure to set your dip switches (2-5 and 2-6) for the number of bins you have installed (see Table 10 in the Basics section). If these switches aren't set properly, the printer will not be able to access the second or third bin. The switches have to be set only once; if the Cut Sheet Feeder is removed to use pinfeed paper, you do not have to reset the switches.
- *Printer does not recognize bin 3*
  - The ImageWriter LQ expansion bin can either be the second or third bin of the Cut Sheet Feeder. If the gear configuration plug is left in, the bin will function as bin 2; if the gear configuration is removed, the bin becomes bin 3.
- *Paper skewed (bent) from expansion bin 3*
  - Add 3.1 mm rubber bumpers to the bottoms of expansion bins 2 and 3. See Additional Procedures for correct placement.

- *Documents going into wrong bins*
  - Bins are selected through the Options button on the Print dialog box of the software being used. You can select up to two bins per job, but your application must spool the whole document as a job. Currently some applications treat each page of a file as a separate job, and all pages will come out of the bin selected under "First Sheet From." Other applications will allow you to print one job from two different paper bins. Have the customer check whether the application used supports multiple-bin feeding.
  
- *Envelope feeding problems*
  - Since envelopes generally are thicker than cut sheets, the customer must be aware of the following:
    - Make sure to adjust the paper thickness lever when printing envelopes.
    - Reset the paper thickness lever back to position 1 when you resume printing on cut sheets.
    - Because of the difference in paper thickness between cut sheet and envelopes, do not run cut sheets and envelopes in the same print job.

---

## □ SYMPTOM/CURE CHART

### Power Problems

### Solutions

- *Power light off and no carrier motion*
  1. Test the primary fuse. If defective, replace it.
  2. Test the three secondary fuses. If any are defective, replace the defective one(s).
  3. Test the power switch. If defective, replace it.
  4. Replace the main board.
  5. Replace the transformer.
  6. Replace the noise filter PCA.

### Communication Problems

### Solutions

- *No printing or garbled printing*
  - Perform the printer self-test.  
  
**If the self-test passes**, run the diagnostics to test the main board.  
  
**If the self-test fails**, replace the main board.

### Paper Feed Problems

### Solutions

- *No paper feed*
  1. Check the paper feed gear train and clear it if it is obstructed.
  2. Test the paper-handling change switch. If defective, replace it.
  3. Test the paper feed motor. If defective, replace it.
  4. Replace the main board.
- *Paper bail doesn't automatically open and close*
  1. Test the auto-load solenoid. If defective, replace it.
  2. Replace the main board.

## Carrier Problems

## Solutions

- *Carrier moves at power on, but doesn't return to home position*
  1. Test the home position switch. If defective, replace it.
  2. Perform the "Home Position Switch Adjustment," Section 3, Adjustments.
  3. Replace the main board.
- *Power light on, no carrier motion*
  1. Check and, if obstructed, clear the carrier area.
  2. Test the carrier motor. If defective, replace it.
  3. Replace the main board.
- *Carrier strikes the right-side frame when printing on 4-part carbonless forms or printing on the perforated edge of tractor-feed paper.*
  - Perform the "Card Guide Adjustment," Section 3, Adjustments.
- *Carrier moves at power on, but doesn't return to home position*
  1. Test the home position switch. If defective, replace it.
  2. Perform the "Home Position Switch Adjustment," Section 3, Adjustments.
  3. Replace the main board.
- *Carrier strikes the left-side frame on power up home position*
  1. Test the home position switch. If defective, replace it.
  2. Perform the "Home Position Switch Adjustment," Section 3, Adjustments.
  3. Verify that the deflector pan is seated against the platen bar. If not, correct it.
  4. Replace the main board.



## Printing Problems

- *Dots missing*
  1. Replace the print head.
  2. Replace the main board.
  3. Replace the print head to relay PCB cables.
  4. Replace the relay PCB to main logic cables.
  
- *Printing continues on a paper-out condition*
  1. Test the paper-out sensor. If defective, replace it.
  2. Replace the main board.
  3. Replace the paper detect sensor.
  
- *Carrier moves but no printing*
  1. Replace the main board.
  2. Replace the print head.
  
- *Nothing printed, the carrier doesn't move, and the power light is on*
  - Perform the printer self-test.  
  
**If the self-test passes,** see Preliminary Checks, No Printing.  
  
**If the self-test fails,** replace the main board.
  
- *Garbage printed*
  - Replace the main board.
  
- *Printing too light*
  1. Perform the "Print Head Gap Adjustment," Section 3, Adjustments.
  2. Perform the "Platen Gap and Parallelism Adjustment," Section 3, Adjustments.
  
- *Printing too dark*
  1. Perform the "Print Head Gap Adjustment," Section 3, Adjustments.
  2. Perform the "Platen Gap and Parallelism Adjustment," Section 3, Adjustments.
  
- *Printing continues with front cover open*
  1. Test the cover-open sensor. If defective, replace the control panel PCA.
  2. Replace the main board.

## Color Printing Problems

- *Color bleeding*
  1. **If the bleeding is consistent across the page,** perform the "Color Ribbon Home Position Adjustment," Section 3, Adjustments.
  2. **If the bleeding increases or decreases across the page,** perform the "Color Ribbon Parallelism Adjustment," Section 3, Adjustments.
  
- *Wrong color printed*
  1. Test the color ribbon detect switch. If defective, replace the color ribbon motor assembly.
  2. Test the color ribbon home position switch. If defective, replace the color ribbon motor assembly.
  3. Test the color ribbon motor. If defective, replace the color ribbon motor assembly.
  4. Replace the main board.
  
- *Only one color is printed*
  1. Test the color ribbon motor. If defective, replace the color ribbon motor assembly.
  2. Replace the main board.

## Other Problems

- *Control panel switches don't work*
  1. Test the control panel switches. If defective, replace the control panel PCA.
  2. Replace the main board.
  
- *Intermittent network problems—print head resets when idle and/or printer stops printing*
  - Replace ROM 02 on the logic board with ROM 03.

---

## □ TESTING THE PRIMARY AND SECONDARY FUSES

### Materials Required

Digital multimeter

### Procedure

1. Turn off the printer and remove the main cover.
2. Remove the fuse to be tested and place a probe at each end of the fuse.

**The resistance of the fuse should be 0 ohms; if the resistance is not, replace the fuse.**

---

## □ TESTING THE POWER SWITCH

### Materials Required

Digital multimeter  
Needlenose pliers

### Procedure

1. Turn off the printer and remove the main cover.
2. Remove the power switch from the case by pressing, with the needlenose pliers, the two plastic tabs at the sides of the switch and, at the same time, pushing the switch out of the case.
3. Connect the multimeter between the two white wires of the power switch and toggle the switch on and off.

**When you turn the power switch on (1), the resistance should be 0 ohms. When you turn the switch off (0), the resistance should be infinite.**

**If the resistances are not as indicated, replace the power switch.**

4. Repeat step 3 for the black wires.

---

## □ TESTING THE HOME POSITION SWITCH

### Materials Required

Digital multimeter

### Procedure

1. Turn off the printer and remove the main cover.

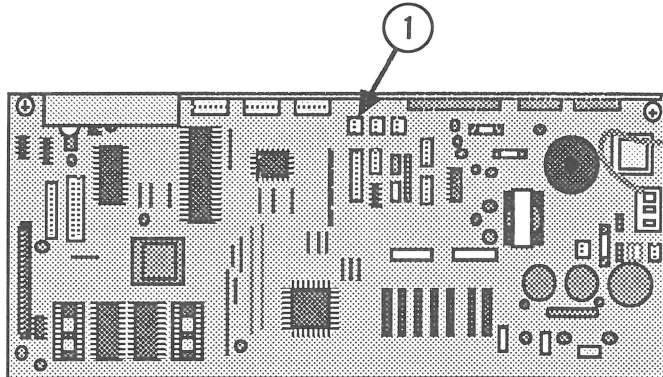


FIGURE 1

2. Disconnect the home position switch cable from main board connector CN10 (Figure 1, #1).

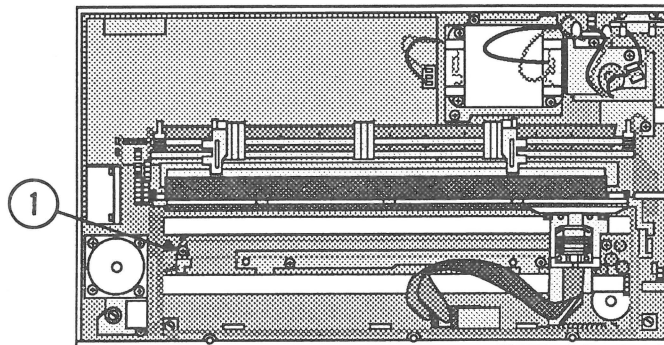


FIGURE 2

3. Connect the multimeter between pins 1 and 2 of the removed connector and toggle the home position switch (Figure 2, #1) with your finger.

**When you depress (close) the home position switch,** the resistance should be 0 ohms. **When you release (open) the switch,** the resistance should be infinite.

**If the resistances are not as indicated,** replace the home position switch.

---

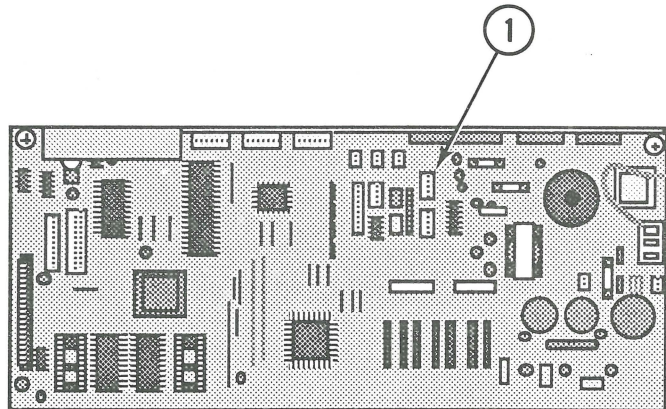
## □ TESTING THE CARRIER DRIVE MOTOR

### Materials Required

Digital multimeter

### Procedure

1. Turn off the printer and remove the main cover.



**FIGURE 3**

2. Disconnect the carrier motor cable from main board connector CN5 (Figure 3, #1).
3. Connect the multimeter between the pins of the removed connector listed below and verify that resistances are as shown.

**Pins to measure Resistance (Ohms)**

1 and 3	1.3
1 and 5	1.3
2 and 4	1.3
2 and 6	1.3
3 and 5	2.6
4 and 6	2.6

**If the resistances are not as shown, replace the carrier motor.**

## □ TESTING THE PAPER-HANDLING CHANGE SWITCH

### Materials Required

Digital multimeter

### Procedure

1. Turn off the printer and remove the main cover.

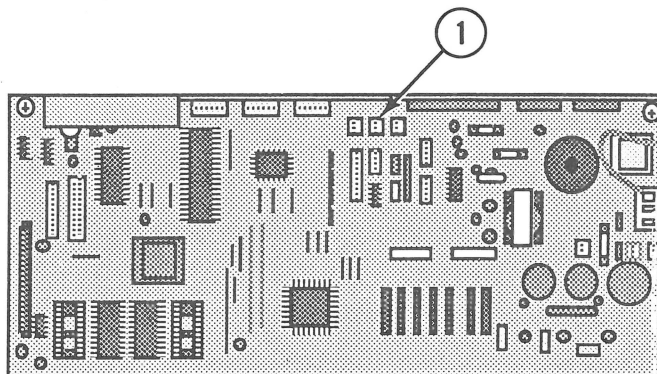


FIGURE 4

2. Disconnect the paper-handling change switch cable from main board connector CN18 (Figure 4, #1).

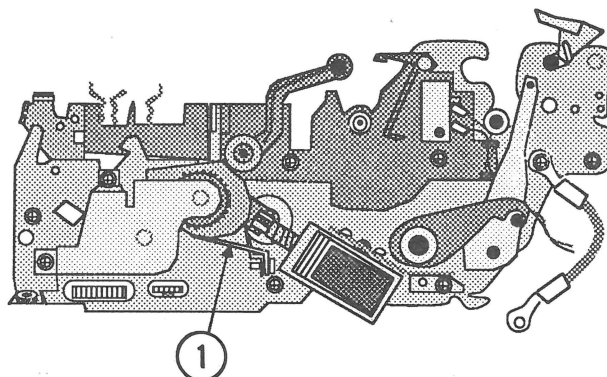


FIGURE 5

3. Connect the multimeter between pins 1 and 2 of the removed connector and alternately depress and release the paper-handling change switch (Figure 5, #1).

**When the paper release lever is depressed**, the resistance should be 0 ohms. **When the lever is released**, the resistance should be infinite.

**If the resistances are not as shown**, replace the paper-handling change switch.

---

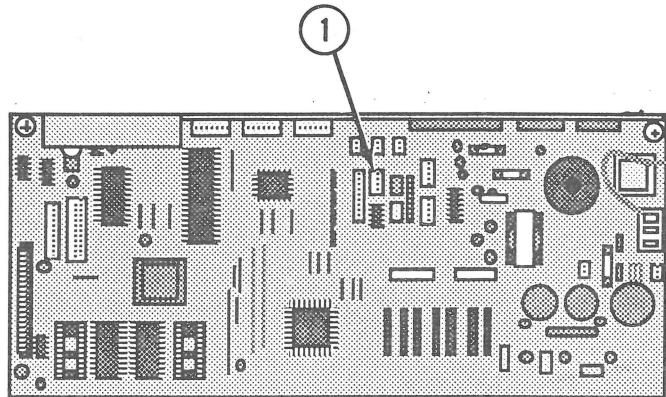
## □ TESTING THE PAPER FEED MOTOR

### Materials Required

Digital multimeter

### Procedure

1. Turn off the printer and remove the main cover.



**FIGURE 6**

2. Disconnect the paper feed motor cable from main board connector CN6 (Figure 6, #1).
3. Connect the multimeter between the pins of the removed connector listed below and verify that resistances are as shown.

<u>Pins to measure</u>	<u>Resistance (Ohms)</u>
------------------------	--------------------------

1 and 3	20
1 and 5	20
2 and 4	20
2 and 6	20
3 and 5	40
4 and 6	40

**If the resistances are not as shown, replace the paper feed motor.**



---

## □ TESTING THE AUTO-LOAD SOLENOID

### Materials Required

Digital multimeter

### Procedure

1. Turn off the printer and remove the main cover.

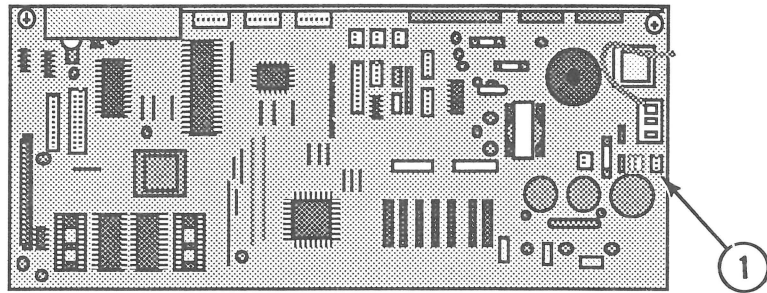


FIGURE 7

2. Disconnect the auto-load solenoid cable from main board connector CN8 (Figure 7, #1).
3. Connect the multimeter between pins 1 and 2 of the removed connector, and then between pins 2 and 3.

The resistance between pins 1 and 2 and between pins 2 and 3 should be infinite.

**If the resistances are not as indicated, replace the auto-load solenoid.**

---

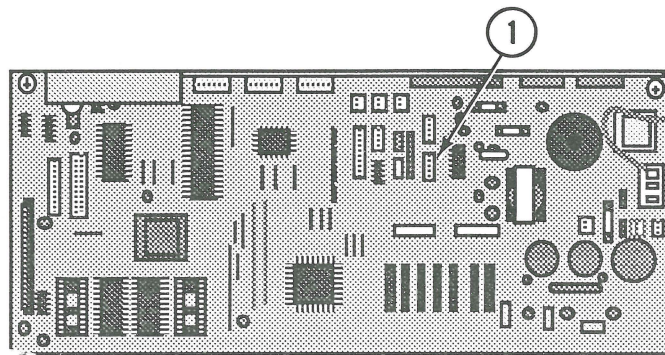
## □ TESTING THE PAPER-OUT SENSOR

### Materials Required

Digital multimeter

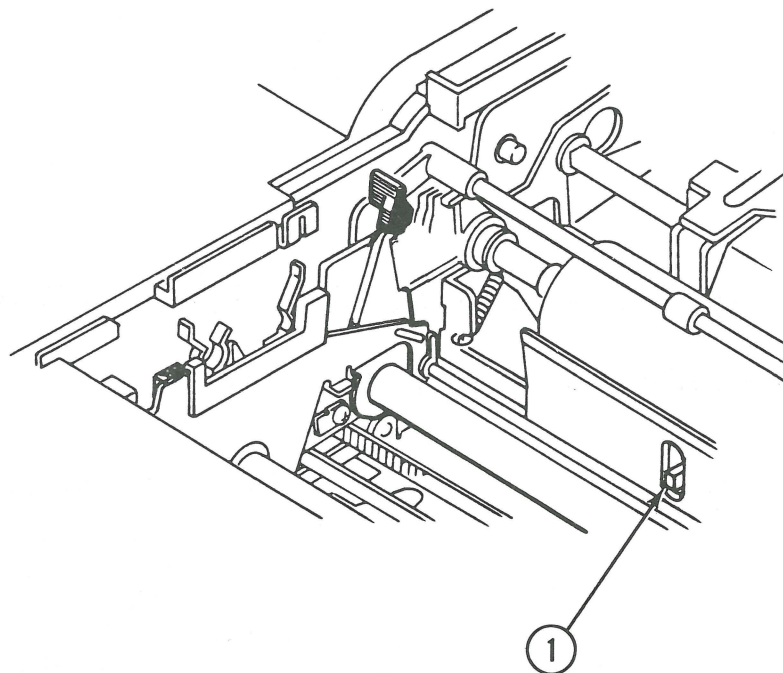
### Procedure

1. Turn off the printer and remove the main cover.



**FIGURE 8**

2. Disconnect the paper-out sensor cable from main board connector CN9 (Figure 8, #1).



**FIGURE 9**

3. Connect the multimeter between pins 4 and 5 of the removed connector and alternately raise and release the paper-out sensor arm (Figure 9, #1).

**When you raise the paper-out sensor arm, the resistance should be 0 ohms. When you release the paper-out sensor arm, the resistance should be infinite.**

**If the resistances are not as indicated, replace the paper-out sensor.**

---

## □ TESTING THE COVER-OPEN SENSOR

### Materials Required

Digital multimeter

### Procedure

1. Turn off the printer and remove the main cover.
2. Connect the multimeter between pins 1 and 13 of the removed connector and open and close the front cover.

**When you close the front cover,** the resistance should be 0 ohms. **When you open the front cover,** the resistance should be infinite.

**If the resistances are not as indicated,** replace the control panel PCA.

---

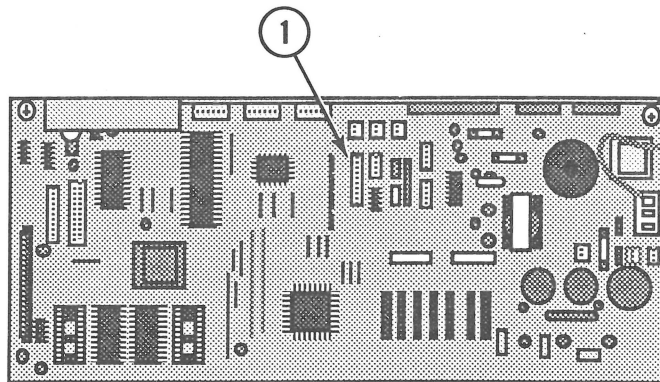
## □ TESTING THE COLOR RIBBON DETECT SWITCH

### Materials Required

Digital multimeter

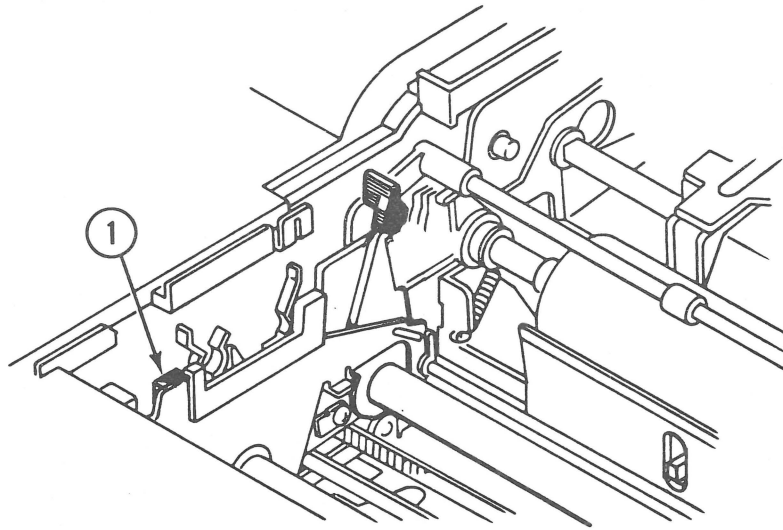
### Procedure

1. Turn off the printer and remove the main cover.



**FIGURE 10**

2. Disconnect the color ribbon assembly cable from main board connector CN7 (Figure 10, #1).



**FIGURE 11**

3. Connect the multimeter between pins 7 and 8 of the removed connector, and alternately depress and release the color ribbon detect switch (Figure 11, #1).

**When you depress the color ribbon detect switch,** the resistance should be 0 ohms. **When you release the switch,** the resistance should be infinite.

**If the resistances are not as indicated, replace the color ribbon detect switch.**

---

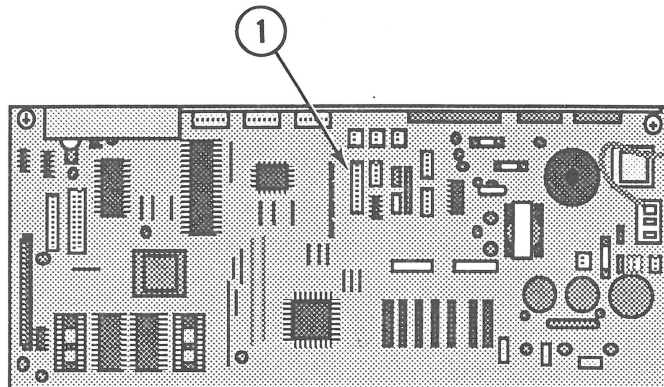
## □ TESTING THE COLOR RIBBON HOME POSITION SWITCH

### Materials Required

Digital multimeter

### Procedure

1. Turn off the printer and remove the main cover.



**FIGURE 12**

2. Disconnect the color ribbon assembly cable from main board connector CN7 (Figure 12, #1).
3. Connect the multimeter between pins 9 and 10 of the removed connector and alternately rotate the front carrier shaft completely forward and then back slightly.

**When you rotate the shaft completely toward you, closing the switch,** the resistance should be 0 ohms. **When you rotate the shaft slightly forward, opening the switch,** the resistance should be infinite.

If the resistances are not as indicated, replace the color ribbon motor assembly.

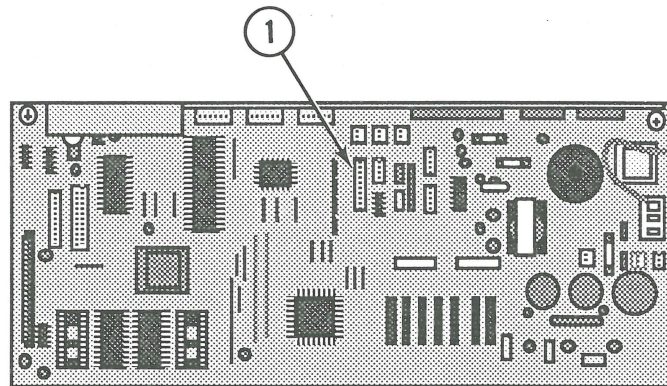
## □ TESTING THE COLOR RIBBON MOTOR

### Materials Required

Digital multimeter

### Procedure

1. Turn off the printer and remove the main cover.



**FIGURE 13**

2. Disconnect the color ribbon assembly cable from main board connector CN7 (Figure 13, #1).
3. Connect the multimeter between the pins of the removed connector listed below, and verify that resistances are as shown.

#### **Pins to measure Resistance (Ohms)**

1 and 3	70
1 and 5	70
2 and 4	70
2 and 6	70
3 and 5	140
4 and 6	140

**If the resistances are not as indicated, replace the color ribbon motor assembly.**

---

## □ TESTING THE CONTROL PANEL SWITCHES

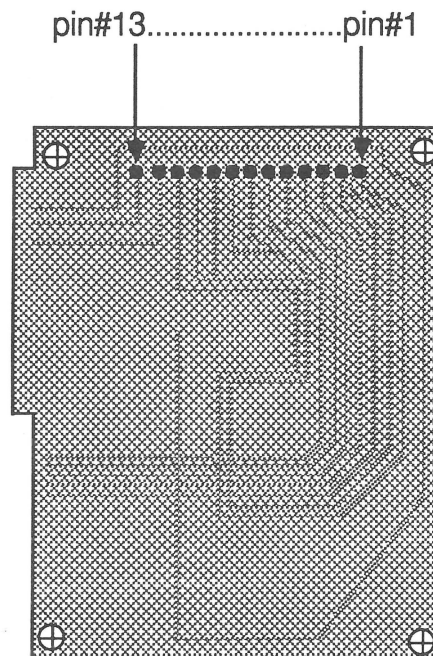
### Materials Required

Digital multimeter

### Procedure

1. Turn off the printer and remove the main cover.
2. Place the cover top-down on a **padded** work surface.
3. Connect the multimeter between the pins of the control panel PCA connector listed below and check to see if the resistance reads 0 ohms when the corresponding control panel switch is depressed. Refer to Figure 14 to determine the location of each pin.

<u>Switch</u>	<u>Check pins</u>
Select switch	10 & 13
Print quality switch	9 & 13
Line feed switch	11 & 13
Form feed switch	12 & 13



**FIGURE 14**

**If any switch fails to show 0 ohms when depressed, replace the control panel PCA.**



🍏 Apple Technical Procedures

# ImageWriter LQ

## Section 5 – Diagnostics

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5.2	Introduction
5.2	Test Descriptions
5.3	Printer Configuration
5.4	Keyboard Equivalents
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5.4	Control Panel Switch Reference
5.5	Equipment Setup
5.5	Printer Setup
5.6	Computer Setup
5.7	Main Logic Board Test
5.8	Carrier Movement Test
5.9	Print Pins Test
5.10	Print Test – Narrow
5.12	Print Test – Wide
5.15	Horizontal Registration Test

**Note:** If a step is underlined, detailed instructions for that step can be found in Section 2, Take-Apart.

---

## □ INTRODUCTION

Diagnostics for the ImageWriter LQ are available in two forms—built-in and disk-based. Built-in tests include a narrow and wide print test, a carrier movement test, a horizontal print registration test, and a print pins test. (These tests are described further under "Test Descriptions" later in this section.) A disk-based diagnostic called *PrintTest™ LQ* includes these same tests; in addition, it enables you to test the printer's serial interface and main logic board.

**Note:** These procedures apply to version 1.3. If you have an earlier version, contact your Apple Support Center for an update.

Table 1 summarizes the available tests and tells where they are available.

**TABLE 1  
IMAGEWRITER LQ  
DIAGNOSTIC TESTS**

<u>Test</u>	<u>Standalone</u>	<u>Computer-Assisted</u>
Main Logic Board		X
Carrier Movement	X	X
Print Pins	X	X
Print Test – Narrow	X	X
Print Test – Wide	X	X
Horizontal Registration	X	X

### Test Descriptions

The six diagnostic tests, along with the problems they identify, are briefly described below.

#### *Main Logic Board Test*

This nonprinting test verifies operation of the main logic board. It is used to identify a nonfunctioning or intermittently functioning main logic board.

***Carrier  
Movement  
Test***

This nonprinting test initiates carrier movement from one end of the platen to the other, between the times the platen and tractor rotate. Uneven mechanical movement indicates damaged, dirty, or worn mechanical parts.

***Print  
Pins Test***

This test prints a series of lines, one line generated by each of the 27 print pins. One or more missing or incomplete lines indicates bent, broken, or misfiring print pins.

***Print Test –  
Narrow***

This option prints an 8.5-inch-wide printout containing the results of the self-test followed by a repeating pattern of letters, numbers, and special characters. These characters are repeated in a pattern called "barber-pole"—in reference to its rotating and twisting illusion. Use this test as a substitute for the wide print test when you don't have access to 15-inch paper.

***Print Test –  
Wide***

This option prints a 13.6-inch-wide printout containing the results of the self-test followed by a repeating pattern of letters, numbers, and special characters. These characters are repeated in a pattern called "barber-pole"—in reference to its rotating and twisting illusion. Use this test when performing the Print Head Gap, Color Ribbon Home Position, or Color Ribbon Parallelism Adjustment. (Refer to Section 3, Adjustments.)

***Horizontal  
Registration  
Test***

This test prints a series of vertical lines in both the right-to-left and left-to-right printing directions. Each series of vertical lines is labeled with a DIP switch setting. Uneven print alignment can be corrected by selecting the appropriate DIP switch setting. Refer to "Horizontal Registration Adjustment," Section 3, Adjustments, for additional information.

This test is also used in performing the home position switch adjustment described in Section 3, Adjustments.

***Printer  
Configuration***

The **Configurations** menu item under **Options** is used to display the ROM version and baud rate of the printer.

**Note:** PrintTest LQ can be used with either version 00 or version 01 ROM. However, the Horizontal Registration test is **not** available with version 00.

## Keyboard Equivalents

This is a list of the keyboard equivalents that may be used to invoke menu selections.

<u>Menu Item</u>	<u>Keyboard Equivalent</u>
Configuration	⌘-K
Test Selections	⌘-T
Quit	⌘-Q

## Tips for Using PrintTest LQ

Here are a few tips to keep in mind while running PrintTest LQ.

- Be sure that the printer select light is on before starting any of the tests or selecting **Configuration** under the **Options** menu.
- Do not cycle the printer on and off during a test or while requesting the configuration from the printer.
- If a test is started while the select light is off, or if the printer is turned off during a test, do the following to resume testing:
  - a) Turn off the printer until the "Start" button reappears on the computer screen.
  - b) Turn on the printer, make sure the select light comes on, and then rerun the test.
  - c) Until you have rerun the test, ignore any error messages displayed by the diagnostic.

## Control Panel Switch Reference

The control panel switches can be used at printer power-on to invoke all the diagnostic tests, with the exception of the main logic board test, without the need for a Macintosh computer. The following table provides a quick reference of the tests and the switches to depress to invoke them.

**TABLE 2**  
**IMAGEWRITER LQ CONTROL PANEL**  
**SWITCH FUNCTIONS**

<u>Test</u>	<u>Press these switches on power-up</u>
Main Logic Board	Unavailable
Print Test – Narrow	Form-feed
Print Test – Wide	Form-feed and Line-feed
Carrier Movement	Line-feed
Horizontal Registration	Form-feed, Line-feed, and Select
Print Pins	Line-feed and Select

---

## **□ EQUIPMENT SET UP**

### **Printer Setup**

Set up the ImageWriter LQ printer before performing any of the diagnostics tests in either mode—computer-assisted or standalone.

### ***Materials Required***

Power cord  
 Color ribbon  
 Several sheets of 8.5- x 11-inch white paper  
 Several sheets of 11- x 15-inch white paper  
 DIP switch setter

### ***Standalone Mode***

1. If the printer power switch is on, turn it off. Plug in the printer.
2. Install the color ribbon, if necessary. (Refer to "Install the Ribbon Cartridge," Section 1, Basics.)
3. Load a sheet of 8.5- x 11-inch paper. (Refer to "Load and Remove Paper," Section 1, Basics.)

**Note:** If you will be using the wide print test, use the 11- x 15-inch paper.

4. Push the paper thickness lever toward the back of the printer to the number-one position.
5. Turn off the printer.

### **Computer- Assisted Mode**

If you will be running diagnostics from a Macintosh computer, make sure DIP switch 2-4 is set to OFF while testing the printer. Do so even if an AppleTalk option card is installed. Otherwise, the diagnostic will be unable to communicate with the printer.

### **Computer Setup**

Set up a Macintosh computer for all computer-assisted diagnostic tests.

### **Materials Required**

Macintosh Plus, SE, SE/30, II, IIx, or IICx computer  
Power cord  
Mouse  
Keyboard and cable  
Monitor, power cord, video card, and cable (Macintosh II, IIx, and IICx only)  
Serial Interface Cable (Peripheral-8)  
*Macintosh Peripheral Tests* disk (Version 1.3 or later)

### **Procedure**

1. Set up the ImageWriter LQ as described in "Printer Setup."
2. Set up the Macintosh computer. (If you need assistance, refer to the user's guide for the Macintosh you are using.)
3. Plug one end of the serial interface cable into the printer port of the computer and the other end into the printer's serial interface socket. (Refer to "Connecting the ImageWriter LQ to Your Macintosh Computer" in *ImageWriter LQ Owner's Guide* for further information.)
4. Turn on the printer, and make sure the green Power and Select indicator lights come on.
5. Turn on the computer with the *Macintosh Peripheral Tests* disk in the disk drive.
6. Double-click the *Macintosh Peripheral Tests* disk to open the disk.
7. Double-click the **PrintTest LQ** icon to launch the diagnostic.

---

## □ MAIN LOGIC BOARD TEST

### Computer-Assisted Mode

1. Complete the printer and computer setup procedures.
2. Select **Test Selections** from the **Options** menu.
3. Select **Main Logic Board Test**. Verify that all other tests are deselected.

If you would like to run the test repeatedly, click **Loop on Selections**.

4. Click **OK** to return to the startup screen.
5. Click **Start** or press <Return> to begin the test.

### Standalone Mode

The Main Logic Board Test is not available in the standalone mode.

### Test Results

No printout will be generated for this test. On-screen prompts will indicate if the main logic board is functioning correctly.

### Corrective Action

**If the main logic board fails the test, replace the main logic board.**

Complete the remaining diagnostic tests to ensure that the printer is operating correctly and is in proper adjustment.



---

## □ CARRIER MOVEMENT TEST

### Computer-Assisted Mode

1. Complete the printer and computer setup procedures.
2. Select **Test Selections** from the **Options** menu.
3. Select **Carrier Movement Test**. Verify that all other tests are deselected.

If you would like to run the test repeatedly, click **Loop on Selections**.

4. Click **OK** to return to the startup screen.
5. Click **Start** or press <Return> to begin the test.

### Standalone Mode

1. Complete the printer and computer setup procedures.
2. Turn on the printer while holding down the **Line-feed** switch. Then release the switch.

### Test Results

No printout will be generated for this test. To pass this test, the carrier should move smoothly across the entire length of the platen from one end to the other. As the carrier moves, the platen and tractor should rotate one or two lines.

### Corrective Action

1. **If the printer does not pass this test**, refer to Section 6, Troubleshooting, to identify which parts of the mechanical assembly require maintenance, repair, or replacement.
2. Complete the remaining diagnostic tests to ensure that the printer is operating correctly and is in proper adjustment.

---

## □ PRINT PINS TEST

### Computer-Assisted Mode

1. Complete the printer and computer setup procedures.
2. Select **Test Selections** from the **Options** menu.
3. Select **Print Pins Test**. Verify that all other tests are deselected.

If you would like to run the test repeatedly, click **Loop on Selections**.

4. Click **OK** to return to the startup screen.
5. Click **Start** or press <Return> to begin the test.

### Standalone Mode

1. Complete the printer and computer setup procedures.
2. Turn on the printer while holding down the **Line-feed** and **Select** switches. Then release both switches.

### Test Results

1. Turn off the printer when it stops printing.
2. Remove the printout and compare it to the sample shown in Figure 1.

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	

FIGURE 1

The printout will show the numbers 1 through 27, one number for each print pin. A line will be printed after each number. Two sets of numbers and lines will be printed.

**To pass this test**, each pin (indicated by numbers 1 through 27) must print a complete line.

**Corrective  
Action**

1. **If one or more print pins do not print or print an incomplete line**, refer to "Dots Missing," in the Symptom/Cure Charts in Section 6, Troubleshooting, to determine the cause of the failure.
2. Complete the remaining diagnostic tests to ensure that the printer is operating correctly and is in proper adjustment.

---

## **□ PRINT TEST – NARROW**

**Computer-  
Assisted Mode**

1. Complete the printer and computer setup procedures.
2. Select **Test Selections** from the **Options** menu.
3. Select **Print Test (narrow)**. Verify that all other tests are deselected.

If you would like to run the test repeatedly, click **Loop on Selections**.

4. Click **OK** to return to the startup screen.
5. Click **Start** or press <Return> to begin the test.

**Standalone  
Mode**

1. Complete the printer and computer setup procedures.
2. Turn on the printer while holding down the **Form-feed** switch. Then release the switch.

1. Turn off the printer when it stops printing.
2. Remove the printout and compare it to the sample shown in Figure 2.

```
SELFTEST
ROMREV(01):
RAM- OKB:  DIPSW Setting  1-On,0-Off,X-Don't care ;
* means current setting of DIP switches.
```

DIPSW#1		DIPSW#2	
<u>123</u>	(National Character Set)	<u>12</u>	(Baud Rate Setting)
* 000	American	* 00	19200
100	Italian	10	1200
010	Danish	01	2400
110	British	11	9600
001	German		
101	Swedish		
011	French		
111	Spanish		
<u>4</u>	(Form Length)	<u>3</u>	(Asynchronous Protocol)
* 0	11inches	* 0	Hardware Handshake
1	12inches	1	XON/XOFF
<u>5</u>	(Perforation Skip)	<u>4</u>	(Option Board)
* 0	Inactive	* 0	Option Disabled
1	Active	1	Option Enabled
<u>67</u>	(Default Character Pitch)	<u>567</u>	(CSF Configuration)
00	10cpi	001	1bin
* 10	12cpi	101	2bin
01	17cpi	X11	3bin
11	160dpi(DRAFT,NLQ)	* 000	1bin+Envelope
	216dpi(LQ)	100	2bin+Envelope
		X10	3bin+Envelope
<u>8</u>	(Carriage Return Function)	<u>8</u>	(Auto Load Position)
* 0	CR only	* 0	Load to first printable line
1	CR+LF	1	Load to bail position

```
#%#&%( )+*,./0123456789::=>?@ABCDEFGHIJKLMNQPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!
"%#&%( )+*,./0123456789::=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#%&'()*+,
-./0123456789::=>?@BCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::
=>?@ABCEDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCDEF
GH IJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQ
RSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRSTUvwxyz[
\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRStuvwxyZ[\]^_`abcdefghijklmnopqrstu
vwx yz[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRStuvWXYz[\]^_`abcdefghijklmno
pqrstuvw xy z[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRstUvwXYZ[\]^_`abcde
fghijklmnopqrstuvw xyz[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQR
stUvwXyz[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRStUvwxyz[\]^_`ab
cdefghijklmnopqrstuvwxyz [\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRS
TUVwxyz[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRSTUvwxyz[\]^_`ab
cdefghijklmnopqrstuvwxyz [\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQ
RSTUVwxyz[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRSTUvwxyz[\]^_`abc
defghijklmnopqrstuvwxyz [\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQ
RSTUVWxyz[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRSTUvwxyz[\]^_`abc
defghijklmnopqrstuvwxyz [\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQ
RSTUVWXyz[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRSTUvwxyz[\]^_`abc
defghijklmnopqrstuvwxyz [\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQ
RSTUVWxYz[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRSTUvwxyz[\]^_`abc
defghijklmnopqrstuvwxyz [\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQ
RSTUVWXYz[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRSTUvwxyz[\]^_`abc
defghijklmnopqrstuvwxyz [\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQ
RSTUVWxyz[\]^_`abcdefghijklmnopqrstuvwxyz{|}~!"#$%&'()*+,-./0123456789::=>?@ABCEDEFGHIJKLMNOPQRSTUvwxyz[\]^_`abc
```

## FIGURE 2

The first part of the printout shows the results of the self-test. This will be followed by repeating letters, numbers, and special characters printed in a "barber-pole" pattern.

## Corrective Action

Check each line of underscored characters for any of the following conditions:

1. **If part of a row of characters or the underline is evenly printed in a second color**, perform the "Color Ribbon Home Position Adjustment," Section 3, Adjustments.
2. **If a second color prints on an angle**, across a row of characters or an underline, perform the "Color Ribbon Parallelism Adjustment," Section 3, Adjustments.
3. **If the print density varies from one side of the printout to the other**, perform the "Print Head Gap Adjustment," Section 3, Adjustments.
4. Complete the remaining diagnostic tests to ensure that the printer is operating correctly and is in proper adjustment.

---

## ☐ PRINT TEST – WIDE

### Computer- Assisted Mode

1. Complete the printer and computer setup procedures.
2. Select **Test Selections** from the **Options** menu.
3. Select **Print Test (wide)**. Verify that all other tests are deselected.

If you would like to run the test repeatedly, click **Loop on Selections**.

4. Click **OK** to return to the startup screen.
5. Click **Start** or press <Return> to begin the test.

### Standalone Mode

1. Complete the printer and computer setup procedures.
2. Turn on the printer while holding down the **Form-feed** and **Line-feed** switches. Then release both switches.

## Test Results

1. Turn off the printer when it stops printing.
2. Remove the printout from the printer and compare it to the sample shown in Figure 3.

The first part of the printout shows the results of the self-test. This will be followed by repeating letters, numbers, and special characters printed in a "barber-pole" pattern.

```

SELFTEST
ROMREV(01);
RAM- OKB:  DIPSW Setting 1-On,0-Off,X-Don't care;
" means current setting of DIP switches.

```

<u>DIPSW#1</u>		<u>DIPSW#2</u>	
	<u>123</u> (National Character Set)		<u>12</u> (Baud Rate Setting)
* 000	American	* 00	19200
100	Italian	10	1200
010	Danish	01	2400
110	British	11	9600
001	German		
101	Swedish		
011	French		
111	Spanish		
	<u>4</u> (Form Length)		<u>3</u> (Asynchronous Protocol)
* 0	11inches	* 0	Hardware Handshake
1	12inches	1	XON/XOFF
	<u>5</u> (Perforation Skip)		<u>4</u> (Option Board)
* 0	Inactive	* 0	Option Disabled
1	Active	1	Option Enabled
	<u>67</u> (Default Character Pitch)		<u>567</u> (CSF Configuration)
00	10cpi	001	1bin
* 10	12cpi	101	2bin
01	17cpi	X11	3bin
11	160dpi (DRAFT,NLQ)	* 000	1bin+Envelope
	216dpi (LQ)	100	2bin+Envelope
		X10	3bin+Envelope
	<u>8</u> (Carriage Return Function)		<u>8</u> (Auto Load Position)
* 0	CR only	* 0	Load to first printable line
1	CR+LF	1	Load to bail position

[illegible]

### FIGURE 3

**Corrective  
Action**

Check each line of underscored characters for any of the following conditions:

1. **If part of a row of characters or the underline is evenly printed in a second color**, perform the "Color Ribbon Home Position Adjustment," Section 3, Adjustments.
2. **If a second color prints on an angle**, across a row of characters or an underline, perform the "Color Ribbon Parallelism Adjustment," Section 3, Adjustments.
3. **If the print density varies from one side of the printout to the other**, perform the "Print Head Gap Adjustment," Section 3, Adjustments.
4. Complete the remaining diagnostic tests to ensure that the printer is operating correctly and is in proper adjustment.



---

## □ HORIZONTAL REGISTRATION TEST

### Computer-Assisted Mode

1. Complete the printer and computer setup procedures.

**Note:** To ensure the accuracy of this test, be sure the **left edge** of the paper lines up with the **red line** on the paper bail.

2. Select **Horizontal Registration Test**. Verify that all other tests are deselected.

If you would like to run the test repeatedly, click **Loop on Selections**.

3. Click **OK** to return to the startup screen.
4. Click **Start** or press <Return> to begin the test.

### Standalone Mode

1. Complete the printer setup procedures.
2. Turn on the printer while holding down the **Form-feed**, **Line-feed**, and **Select** switches. Then release all three switches.

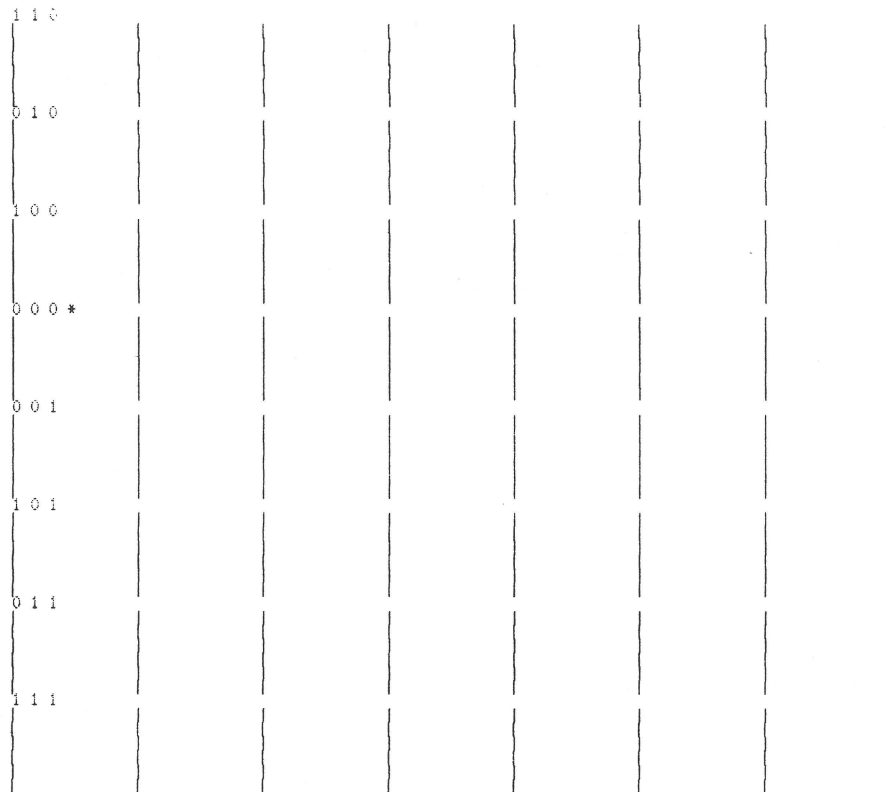
### Test Results

1. Turn off the printer when it stops printing.
2. Reload the printout into the printer.

**Note:** Be sure the **left edge** of the sheet of paper is aligned with the **red line** on the paper bail.

3. To pass the Horizontal Registration Test, the horizontal registration **and** the home position switch must be checked.
  - a) Check the alignment of the vertical line printed closest to the left margin with the black line on the paper bail. **For the home position switch to be in proper adjustment**, both lines must be in alignment.

- b) Remove the printout and compare it to the sample shown in Figure 4. An asterisk (\*) will indicate the current setting of DIP switches S3 positions 6, 7, and 8. **For horizontal registration to be in proper adjustment**, the asterisk must be next to the DIP switch setting with the straightest vertical lines.



**FIGURE 4**

**Corrective  
Action**

1. **If horizontal registration is not adjusted properly**, perform the "Horizontal Registration Adjustment," Section 3, Adjustments.
2. **If the home position switch is not adjusted properly**, perform the "Home Position Switch Adjustment," Section 3, Adjustments.
3. Complete the remaining diagnostic tests to ensure that the printer is operating correctly and is in proper adjustment.

# ImageWriter LQ

## Section 6 – Preventive Maintenance

---

### □ CONTENTS

6.3	Maintenance Schedule
6.4	Getting Started
6.5	As-Needed Maintenance
6.6	Six-Month Maintenance
6.8	After-Take-Apart Maintenance
6.8	Introduction
6.8	Right- and Left-Side Frame
6.10	Pinch Roller
6.12	Ribbon Clutch Gear
6.13	Tractor
6.14	Platen and Paper-out Sensor
6.16	Carrier

**Note:** If a step is underlined, detailed instructions for that step can be found in Section 2, Take-Apart.

## □ MAINTENANCE SCHEDULE

Table 1 summarizes the recommended maintenance intervals.

**TABLE 1**

MAINTENANCE SCHEDULE			
OPERATOR — AS NEEDED			
DEALER SERVICE — Every six months			
DEALER SERVICE — Only after take-apart			
	X		Lubricate carrier
	X		Lubricate platen and clean paper-out sensor
	X		Lubricate tractor
	X		Lubricate ribbon clutch gear
	X		Lubricate pinch roller
	X		Lubricate right- and left-side frames
X	X	X	Clean print head
X	X	X	Clean and lubricate carrier shaft
X	X	X	Clean platen and paper bail rollers
X	X	X	Vacuum out dust and paper particles
X	X	X	Clean cover and external plastic parts
X	X	X	Check print quality

---

## □ GETTING STARTED

### Materials Required

None

### Procedure

1. Make sure the power is off (Figure 1, #1).
2. Open the front cover (Figure 1, #2) and then the back cover (Figure 1, #3) of the printer.
3. Remove the paper and the ribbon cartridge (Figure 1, #4). (Refer to Section 1, Basics.)

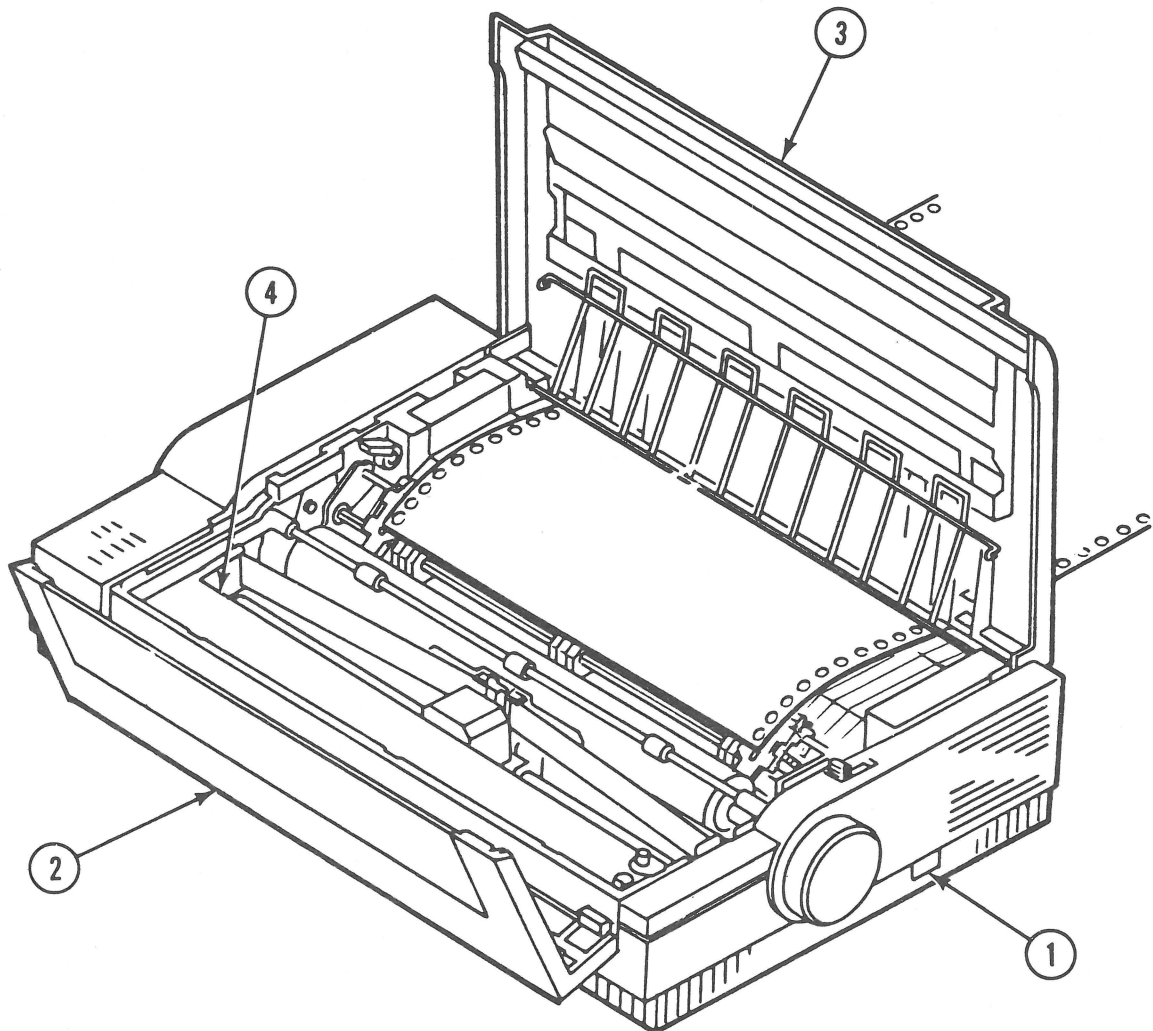


FIGURE 1

---

## □ AS-NEEDED MAINTENANCE

### Materials Required

Lint-free cloth  
Isopropyl alcohol  
Mild detergent-and-water solution  
Shop vacuum

### Procedure

Complete the following maintenance procedure as needed and as part of the "Six-Month" and "After-Take-Apart" maintenance procedures.

1. Complete the "Getting Started" procedure.
2. Vacuum out any dust, paper particles, or dirt from inside the printer.
3. Clean the platen surface and paper bail rollers with a lint-free cloth moistened with alcohol.
4. Load the paper and the ribbon cartridge. (Refer to Section 1, Basics.)
5. Close the back cover and then the front cover.
6. Clean the cover surfaces and external plastic parts with a cloth moistened with a mild detergent-and-water solution.
7. Perform the Color Alignment and Print Head Gap Tests to check print quality. (Refer to Section 5, Diagnostics.)

---

## □ SIX-MONTH MAINTENANCE

### Materials

Floil G-488  
Lint-free cloth  
Lint-free cotton swab  
Isopropyl alcohol or Freon

The following maintenance procedure should be performed every six months. (It is also performed at the end of the After-Take-Apart Maintenance procedure.)

### Procedure

1. Complete the "Getting Started" procedure.

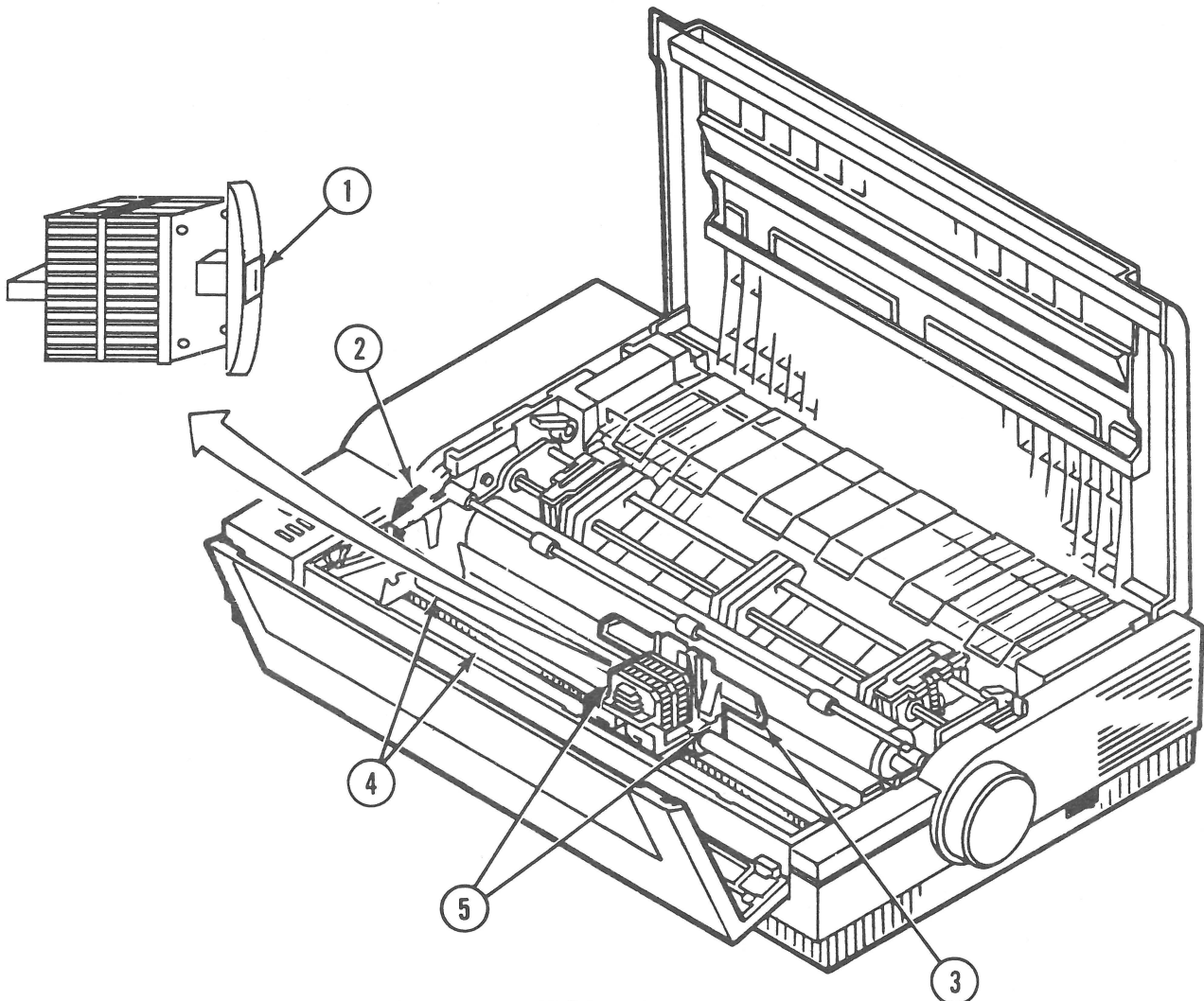


FIGURE 2



2. To clean the print head (Figure 2, #1):
  - a) Push the paper thickness lever (Figure 2, #2) toward the front of the printer to the number five position.
  - b) Remove the card guide (Figure 2, #3).
  - c) Gently wipe the print head with a cotton swab moistened with alcohol or freon (Figure 2, #1).
  - d) Replace the card guide (Figure 2, #3). (Perform the Card Guide Adjustment - see Section 3, Adjustments.)
3. Wipe old oil and dirt off the carrier shaft (Figure 2, #4) with a lint-free cloth.
4. Lubricate the carrier shaft by applying four drops of Floil G-488 to each felt wiper located under the carrier assembly (Figure 2, #5).
5. Complete the "As Needed" maintenance procedure.

---

## □ AFTER-TAKE-APART MAINTENANCE

### Materials Required

Floil G-488  
Floil 947-P  
Molykote BR2-S  
Small, soft brush  
Lint-free cloth

### Introduction

After taking apart any of the following assemblies, follow the appropriate preventive maintenance instructions (for that assembly only) in this section:

- Right- and Left-Side Frame
- Pinch Roller
- Ribbon Clutch Gear
- Tractor
- Platen and Paper-out Sensor
- Carrier

After servicing the part in question, you should also complete the "As-Needed Maintenance" and "Six-Month Maintenance" procedures before returning the printer to the customer.

### Right- and Left-Side Frame

1. Complete the "Getting Started" procedure.
2. Clean the parts identified (Figure 3, #1) by wiping off any old oil and dirt with a lint-free cloth.
3. Lubricate each lubrication point identified (Figure 3, #1) with one drop of Floil G-488.
4. Complete the maintenance procedure for any other assemblies taken apart.
5. Replace the mechanical parts.
6. Complete the "As-Needed Maintenance" and "Six-Month Maintenance" procedures.

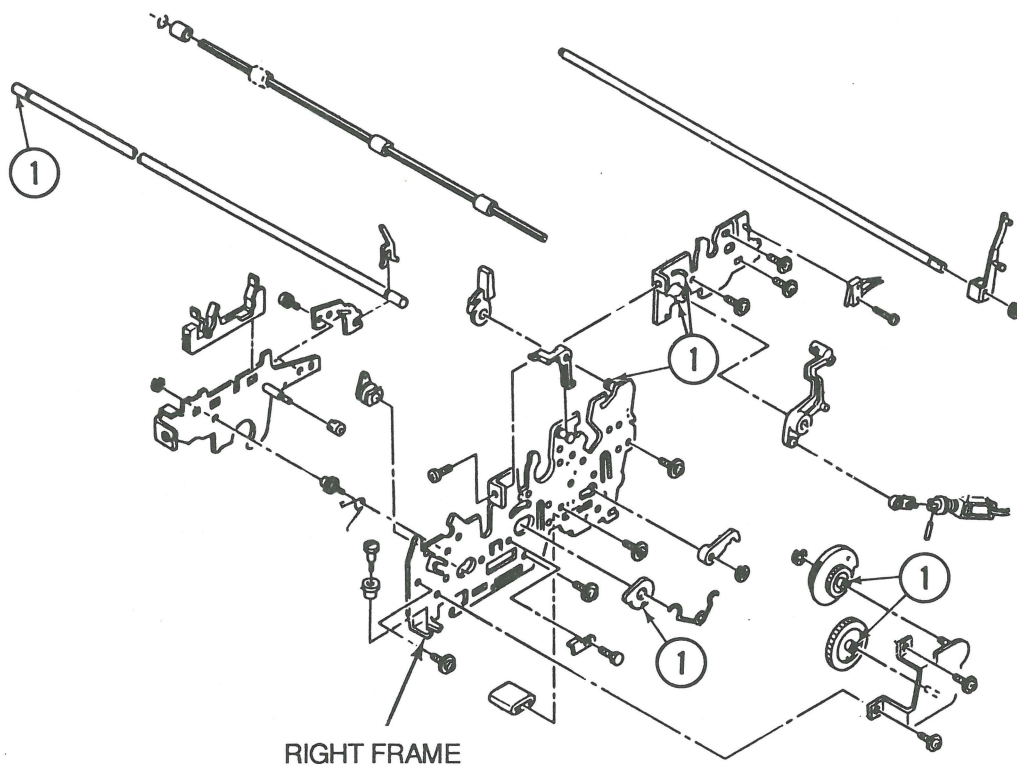
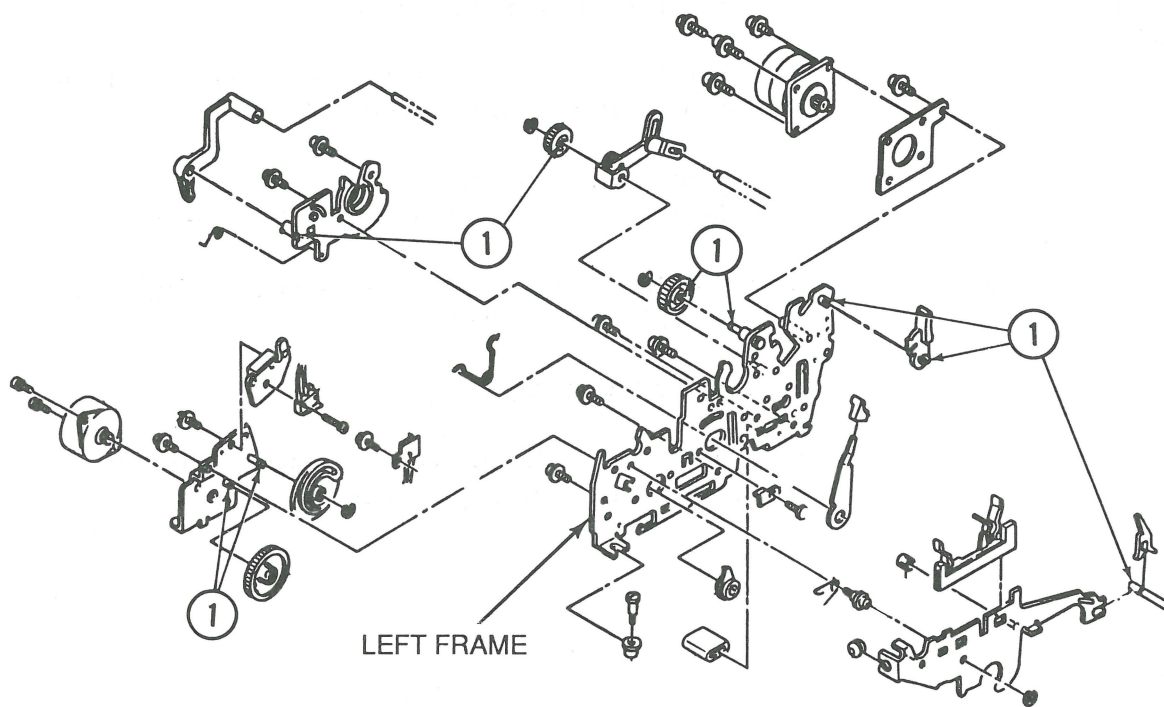


FIGURE 3

**Pinch  
Roller**

1. Complete the "Getting Started" procedure.
2. Clean the parts identified (Figure 4, #1) by wiping off any old oil and dirt with a lint-free cloth.
3. Lubricate each lubrication point identified (Figure 4, #1) with one drop of Floil G-488.
4. Complete the maintenance procedure for any other assemblies taken apart.
5. Replace the mechanical parts.
6. Complete the "As-Needed Maintenance" and "Six-Month Maintenance" procedures.

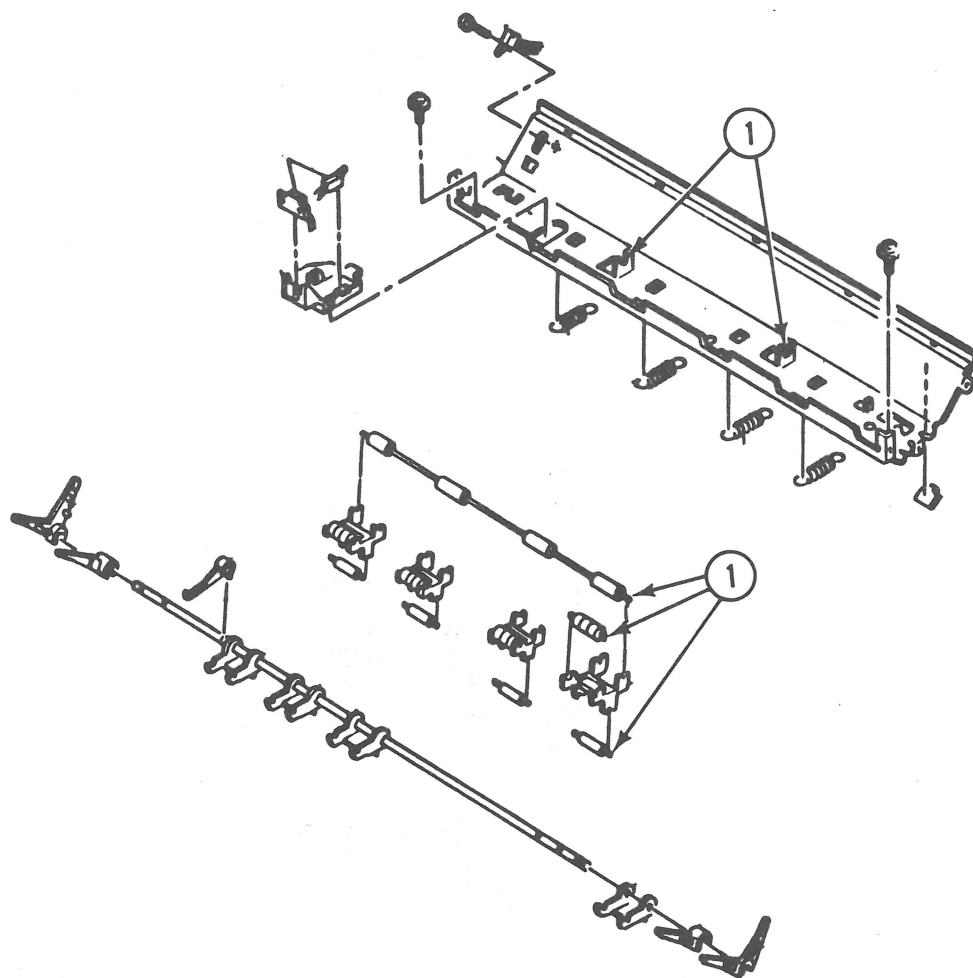


FIGURE 4

## Ribbon Clutch Gear

1. Complete the "Getting Started" procedure.
2. Clean the parts identified (Figure 5, #1) by wiping off any old oil and dirt with a lint-free cloth.
3. Lubricate each lubrication point identified (Figure 5, #1) with one drop of Floil G-488.
4. Complete the maintenance procedure for any other assemblies taken apart.
5. Replace the mechanical parts.
6. Complete the "As-Needed Maintenance" and "Six-Month Maintenance" procedures.

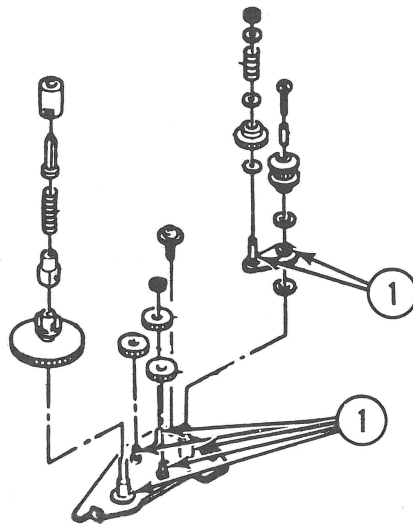


FIGURE 5

## Tractor

1. Complete the "Getting Started" procedure.
2. Clean the parts identified (Figure 6, #1) by wiping off any old oil and dirt with a lint-free cloth.
3. Lubricate each lubrication point identified (Figure 6, #1) with a coating of Molykote BR2-S.
4. Complete the maintenance procedure for any other assemblies taken apart.
5. Replace the mechanical parts.
6. Complete the "As-Needed Maintenance" and "Six-Month Maintenance" procedures.

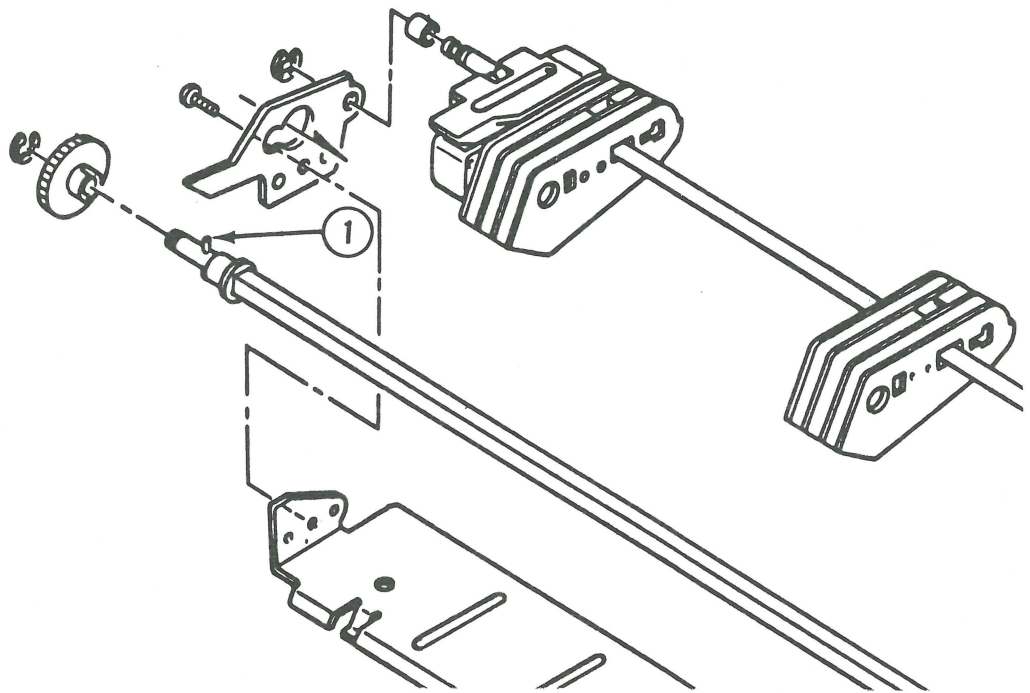


FIGURE 6

**Platen and  
Paper-out  
Sensor**

1. Complete the "Getting Started" procedure.
2. Clean the parts identified (Figure 7, #1 and #2) by wiping off any old oil and dirt with a lint-free cloth.
3. Lubricate each platen lubrication point identified (Figure 7, #1) with one drop of Floil G-488. **Do not** lubricate the paper-out sensor (Figure 7, #2).
4. Complete the maintenance procedure for any other assemblies taken apart.
5. Replace the mechanical parts.
6. Complete the "As-Needed Maintenance" and "Six-Month Maintenance" procedures.



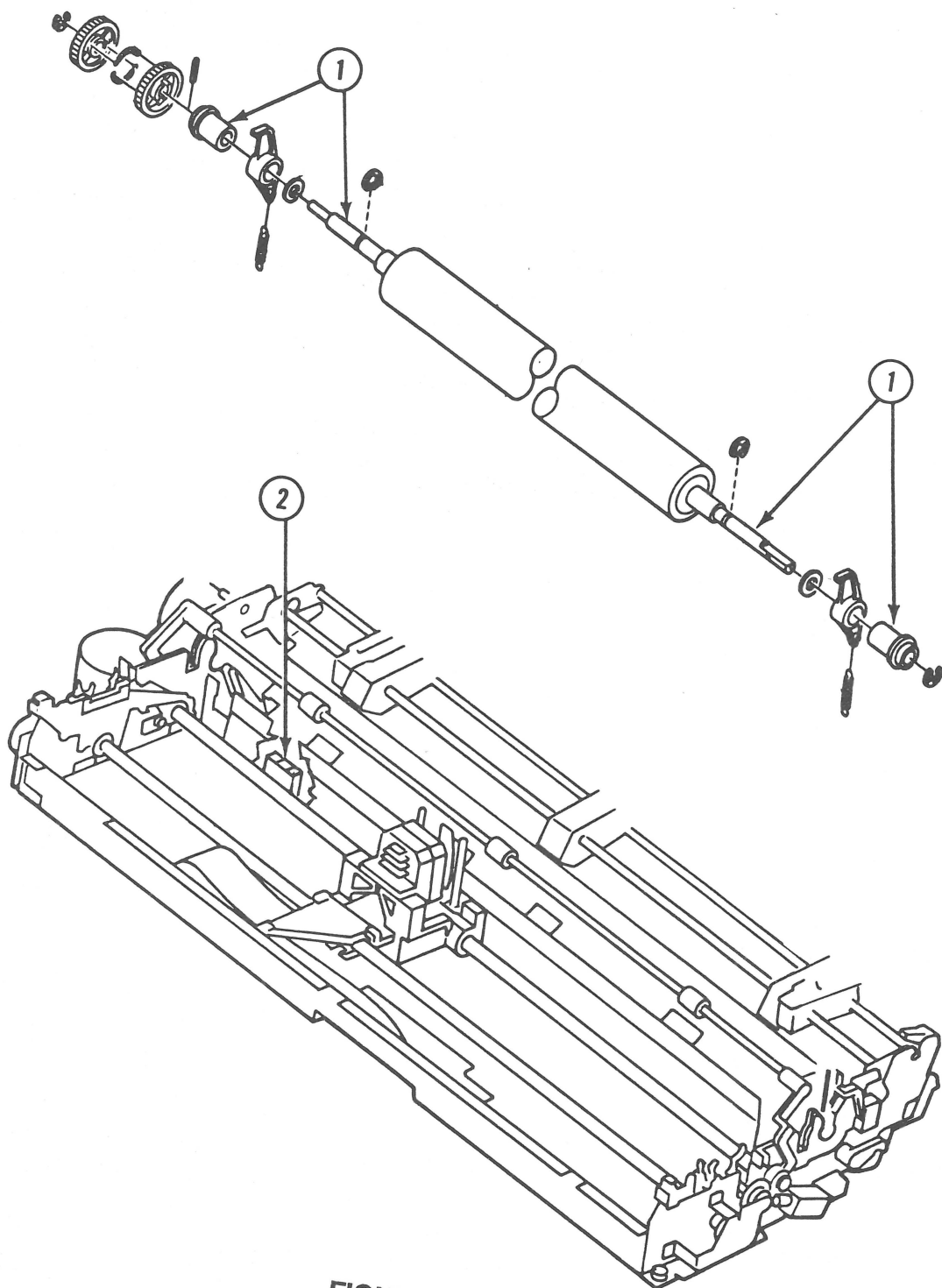


FIGURE 7

## Carrier

1. Complete the "Getting Started" procedure.
2. Clean the carrier shafts (Figure 8, #1 and #2) by wiping off any old oil and dirt with a lint-free cloth.
3. Lubricate each lubrication point (Figure 8, #3) with one drop of Floil G-488. Lubricate the remaining lubrication points (Figure 8, #2) with one drop of Floil 947-P.
4. Complete the maintenance procedure for any other assemblies taken apart.
5. Replace the mechanical parts.
6. Complete the "As-Needed Maintenance" and "Six-Month Maintenance" procedures.

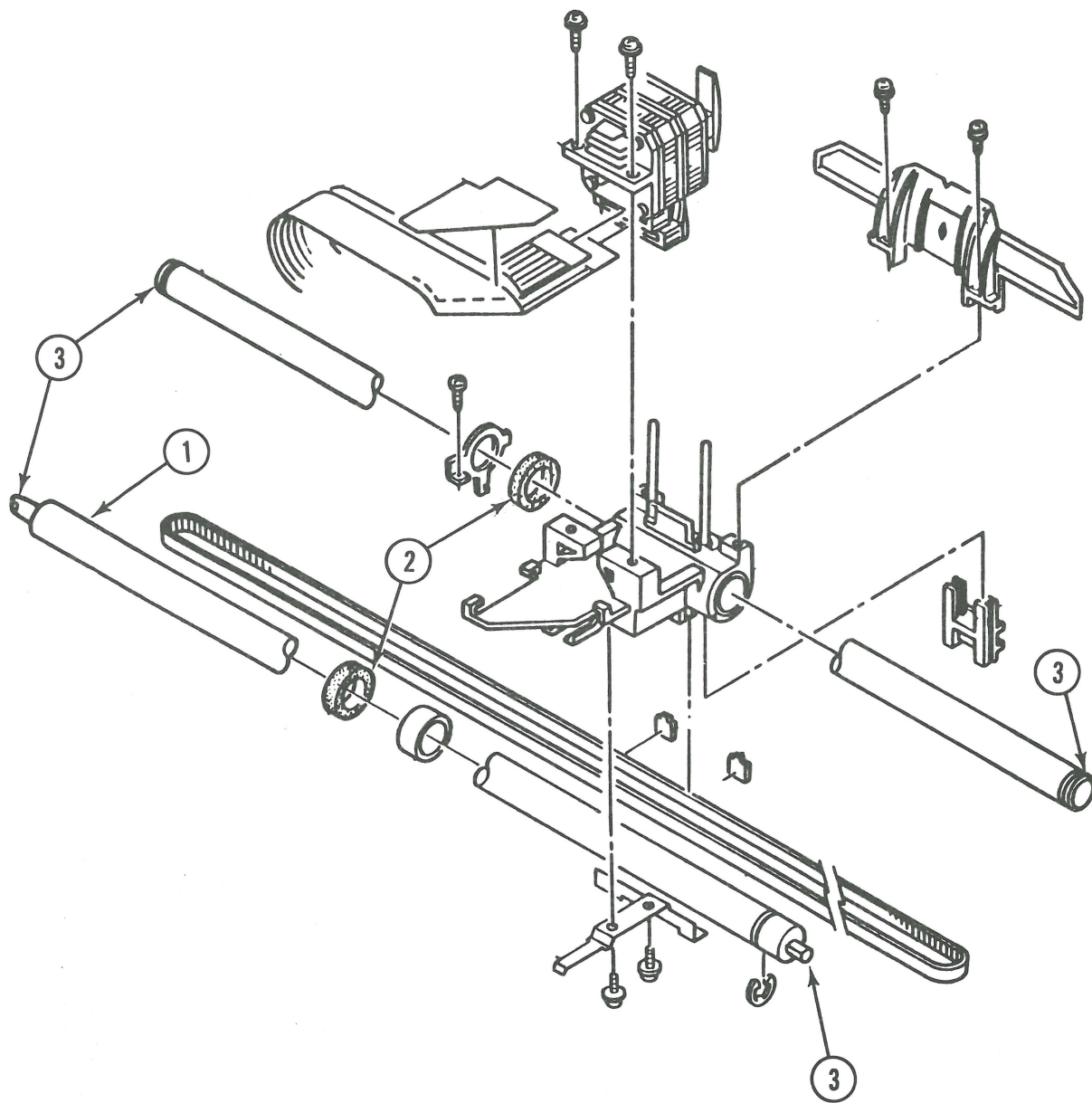


FIGURE 8

# ImageWriter LQ

## Section 7 – Additional Procedures

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7.3	Interrupter Switch Modification
7.3	Materials Required
7.4	Remove Home Position Switch
7.5	Remove Stepper Motor Screws
7.5	Install Position Sensor Assembly
7.6	Install Interrupter
7.8	Install Ribbon Lift Bail Clip
7.9	Adjustment Check
7.10	Cut Sheet Feeder
7.10	Gear Configuration Plug
7.12	Expansion Bin Bumper Placement

---

## □ INTERRUPTER SWITCH MODIFICATION

The purpose of the Interrupter Switch Modification is to prevent the print head from printing beyond the right side (column 156 at 12 characters per inch) of the platen, if interference should occur. Interference can occur if the print head is forced beyond its print margin and the carriage bumps into the side frame. Currently any interference on the left side will deselect the printer and prevent any further print motion. This new modification will also deselect the printer should the print head reach the right-side frame. This condition can occur when:

- there is a paper or ribbon jam
- the printer prints on the perforation (the tear-off line between sheets), or
- the paper thickness lever is not set correctly.

Installing the interrupter switch modification requires that the following steps be taken:

1. Removal of the home position switch
2. Replacement of three screws on the stepper motor
3. Installation of the new position sensor assembly (in place of the home position switch)
4. Installation of the interrupter device on the drive belt
5. Installation of the plastic clip on the ribbon lift bail

### Materials Required

Phillips screwdriver (magnetic is helpful)  
Home position switch kit  
Diagonal cutters  
Flatblade screwdriver  
Small needlenose pliers

## Remove Home Position Switch

1. Remove the top cover.
2. Clip all tie wraps around the bundle of wires along the left side of the printer, going from the motors and switches to the main logic board.
3. Follow the two wire leads from the home position switch that go around the left side of the stepper motor and lead to connector CN 10 (Figure 1, #1) on the back of the logic board. Unplug the connector at CN10.

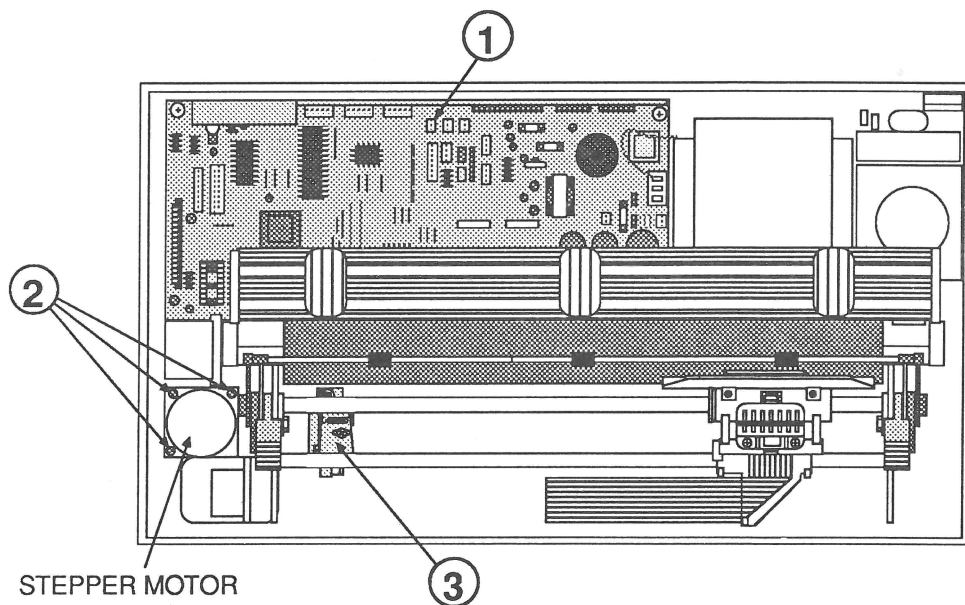


FIGURE 1

4. Using a phillips screwdriver, remove the screw (Figure 2, #1) that holds the home position switch (Figure 2, #2) in place. Save this screw, as you will use it for the new switch.

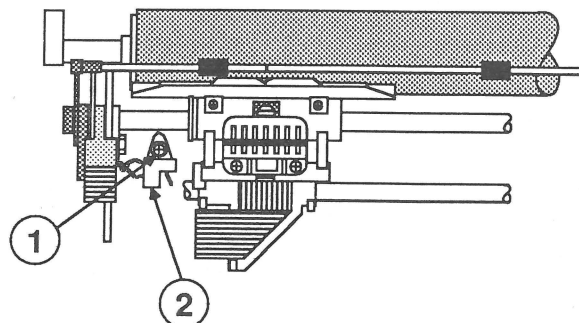


FIGURE 2

5. Remove the home position switch, and pull the two wires from the switch through the small hole at the bottom of the left frame.

### Remove Stepper Motor Screws

1. Remove the three screws (Figure 1, #2) from the stepper motor.

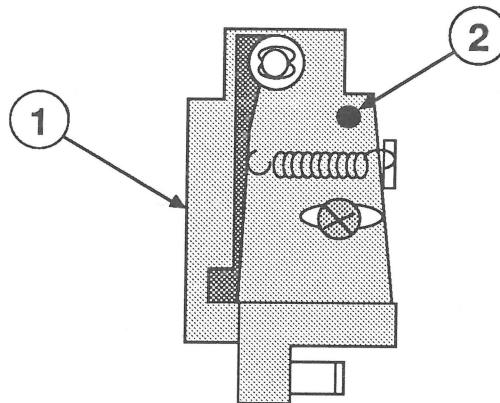
**Note:** Do not remove or lift up on the motor while the screws are out. Doing so will necessitate a readjustment of the drive belt.

2. Install the three new screws from the upgrade kit.

**Note:** This step must be done before going any farther.

### Install Position Sensor Assembly

1. Run the connector and wire through the small hole on the bottom-left carriage plate, so that the wire can be laid alongside the stepper motor and lead to the back of the PCB where connector CN10 is located.
2. Position the sensor assembly (Figure 3, #1) the same way as the old home position switch, making sure the pilot pin (Figure 3, #2) in the assembly goes into the hole above the screw hole (Figure 1, #3). Secure the assembly with the one screw. This is the adjustment screw and will be used to correctly position the switch later.

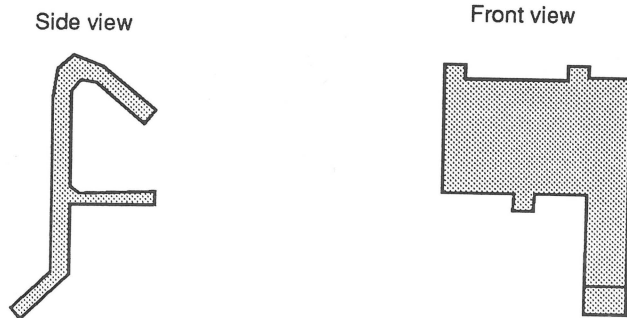


**FIGURE 3**

3. Plug in the connector to CN10.

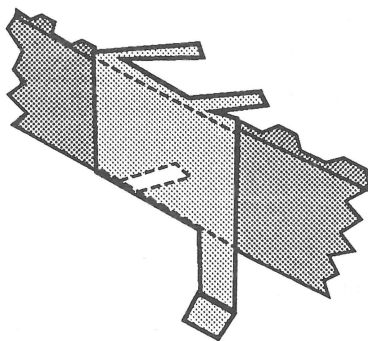
## Install Interrupter

1. Move the print head all the way to the right side of the carriage.
2. Position the interrupter device (Figure 4) on the black rubber drive belt in the following way:

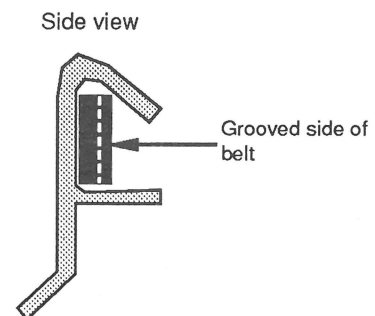


**FIGURE 4**

- a) If the pins are not bent already, prebend the top pins to a 45-degree angle and the bottom pin to 90 degrees as shown in Figures 5 and 6.



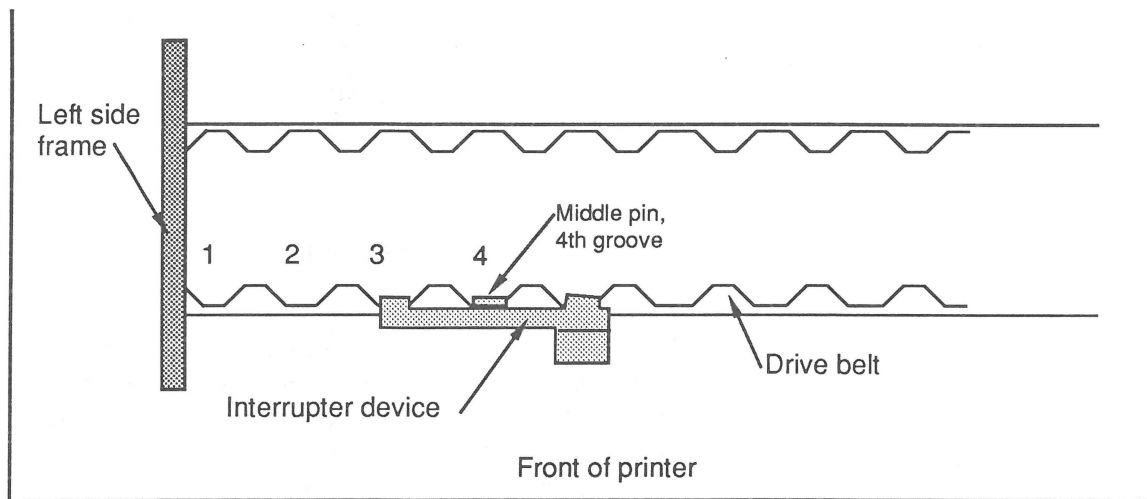
**FIGURE 5**



**FIGURE 6**



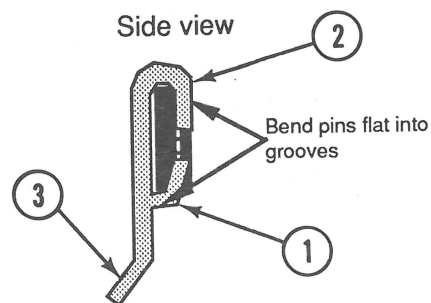
- b) Look at the left front of the drive belt. Position the middle pin of the interrupter on the fourth groove of the belt from the side frame. (See Figure 7.)



**FIGURE 7**

- c) Wrap and press the bottom middle pin (Figure 8, #1) of the interrupter, from the underside of the belt, into the fourth groove.
- d) Wrap and press the two upper pins (Figure 8, #2) of the interrupter, from the top side of belt, in the corresponding grooves on the belt.

**Note:** Make sure the long tang (Figure 8, #3) of the interrupter is pointing down toward the base plate of the printer.



**FIGURE 8**

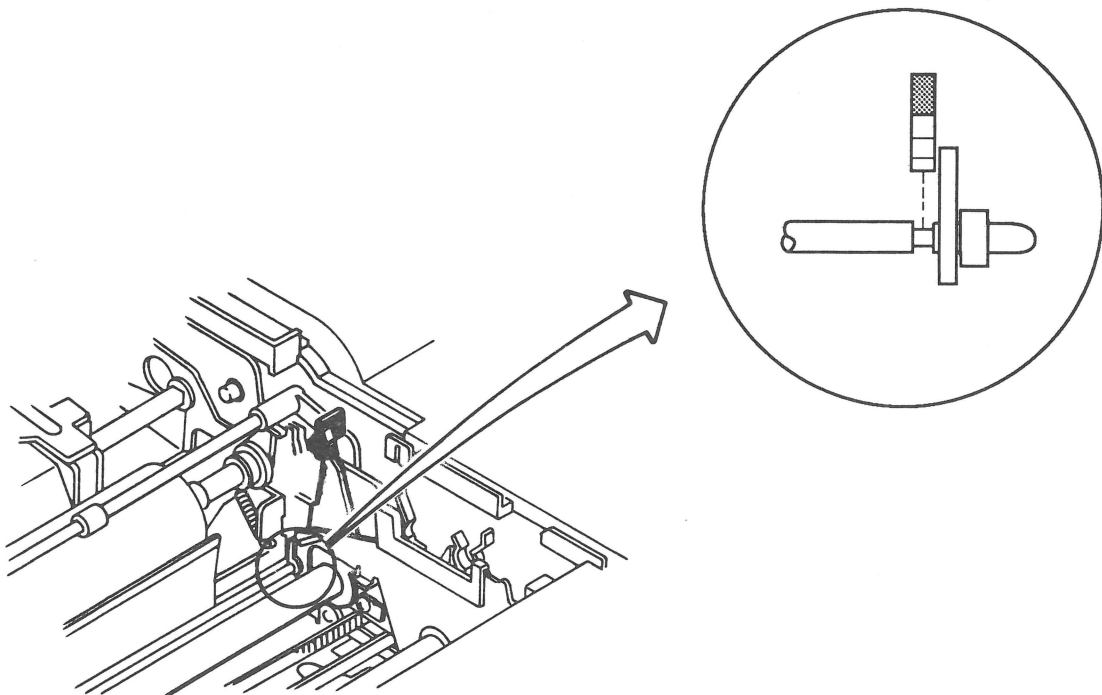
## Install Ribbon Lift Bail Clip

1. Remove the right-side clip (Figure 9) by grabbing the upper part of the clip with needlenose pliers, and pulling upward.



**FIGURE 9**

2. Install the new clip by holding the top part of the clip with the needlenose pliers and inserting the clip on the bail shaft. Make sure the clip goes around the cutout ring on the shaft, and the long upper arm is positioned toward the rear of the printer (see Figure 10).



**FIGURE 10**

## Adjustment Check

1. Move the print head to the left to about the center of the printer.
2. Now move the print head all the way back to the right side and observe where the interrupter stops.
3. Loosen the switch assembly screw and move the assembly so that the long bar engages the interrupter and you can hear the switch click; then tighten the screw.
4. Make sure that the switch operates (the interrupter arm engages the assembly arm) by moving the print head away from the right side of the carriage and then back again. The switch should click every time the print head reaches the right side of the carriage. If it does not click, then you must readjust the assembly until this action occurs.
5. Check the left-side home position adjustment by referring to the Home Position Switch Adjustment in Section 3 of these technical procedures and perform the adjustment procedures.

**Note:** If the home position adjustment cannot be performed correctly, then you must reposition the interrupter on the drive belt and do both adjustments again. It is important that the deselect switch is activated whenever the print head moves all the way to the right-side frame and also when the print head returns far enough to the left side to be in the home position.

6. Finally, use the tie wraps supplied with the home position switch kit to tie the two switch wires to the remaining wires.
7. Put the cover back on the printer. (Refer to the Take-Apart procedures.)

---

## □ CUT SHEET FEEDER

### Gear Configuration Plug

When a second expansion bin is added to the Cut Sheet Feeder, a gear configuration plug is removed to select that bin as bin 3. If bin 3 at some later time is to be used as the first expansion bin (bin 2) on another printer, the configuration plug must be reinstalled on it. This procedure refers to the bins in the following manner:

- Cut Sheet Feeder is **bin 1**
- The first expansion bin is **bin 2**
- The second expansion bin is **bin 3**

### *Procedure*

1. If the Cut Sheet Feeder (bin 1) is still attached to the printer, open the front cover and remove the feeder assembly by pulling it straight up.
2. To separate the expansion bins from the Cut Sheet Feeder:
  - a) Raise the tension release lever and locate the hole (Figure 10, #1) just below the wire paper guide on the Cut Sheet Feeder. Push the point of a screwdriver into that hole.

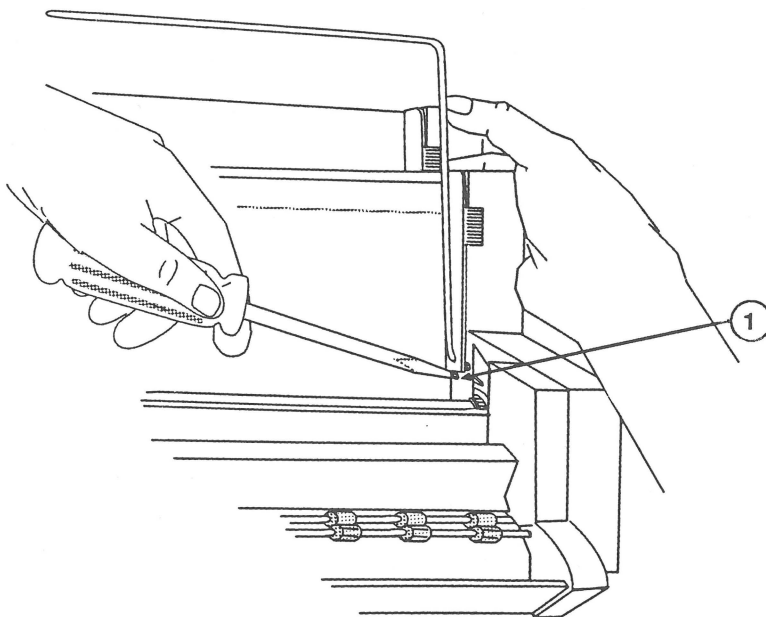
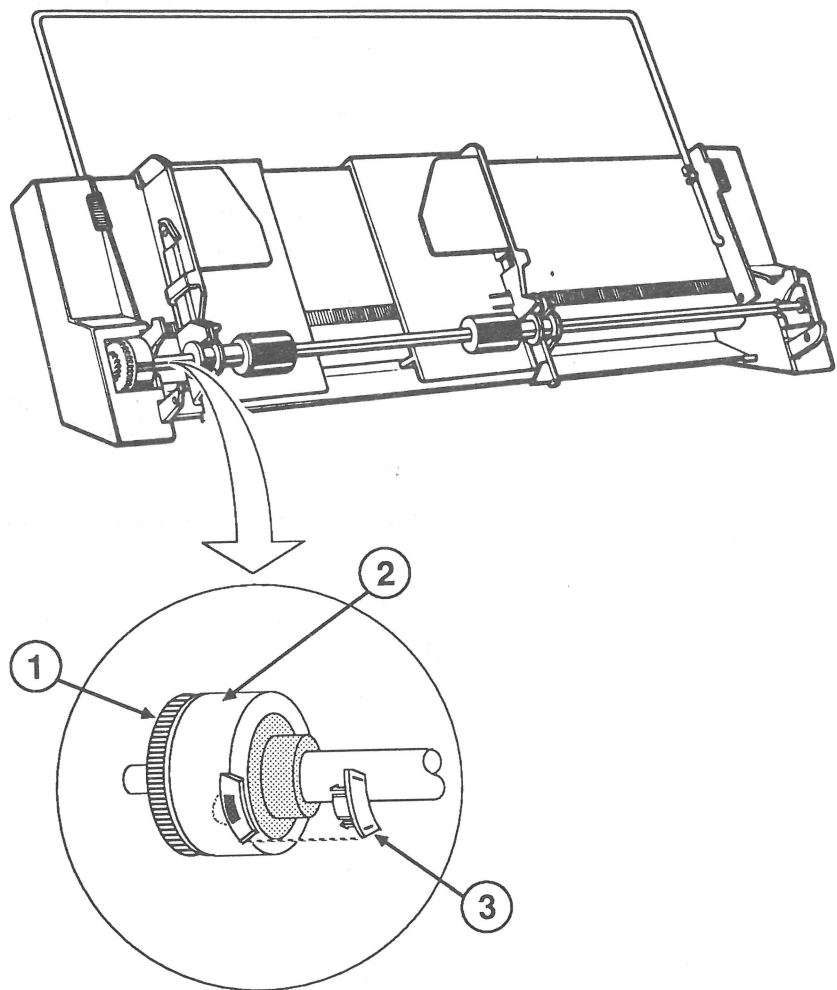


FIGURE 10

- b) With your right thumb on the top of bin 2 and your fingers behind bin 1, press the screwdriver into the hole to disengage the plastic clip attaching bin 2 to the Cut Sheet Feeder.
  - c) When the bins snap apart on the left, repeat steps a and b to completely separate the bins.
- 3. Repeat step 2 to separate bin 3 from bin 2.
  - 4. Locate the drive gear (Figure 11, #1) on bin 3. Rotate the gear toward you until the plastic roller (Figure 11, #2) rotates with the gear.



**FIGURE 11**

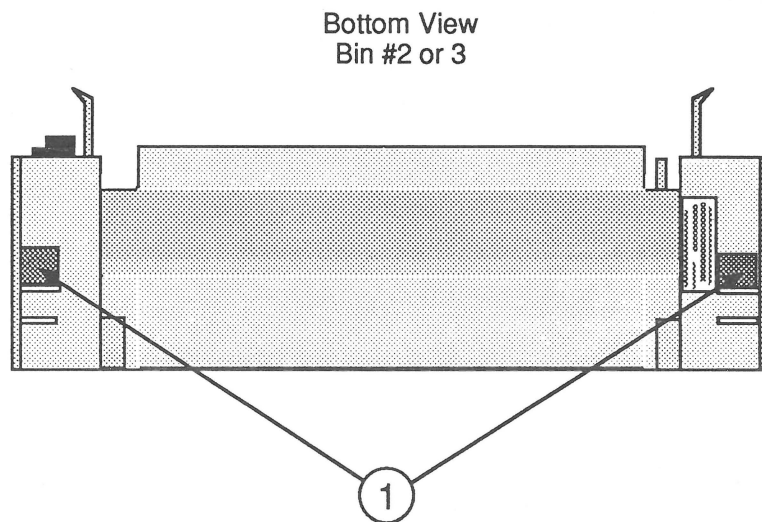
- 5. Install the configuration plug as shown in Figure 11, #3.

6. Rotate the gear and verify that the plastic roller also turns.
7. Replace the two gear box covers on the back of expansion bin 1 (bin 2).

### **Expansion Bin Bumper Placement**

To reduce paper skewing problems from bin 3 when all three bins are attached to the cut sheet feeder, two rubber bumpers should be installed on the bottom of the expansion bins, as follows:

1. Find the correct locations (Figure 12, #1) for the rubber bumpers.
2. Make sure the locations are free from dirt and grease.
3. Peel off the backing paper from the bumper pads one at a time.
4. Press the bumper pads on the expansion bins in the exact locations as indicated in Figure 12.



**FIGURE 12**

---

## □ VOLTAGE CONVERSION

These procedures describe the steps required to convert a 110V ImageWriter LQ to a universal voltage model—one that supports 220V as well as 110V. The printer will then be switch-selectable between 110V and 220V.

The conversion involves removing the present power supply and replacing it with a new universal power supply assembly.

### Materials Required

ImageWriter LQ to be converted  
Universal power supply  
#2 Phillips screwdriver

### Procedure

1. Remove the power supply following the procedures in Section 2, Take-Apart.
2. Install the universal power supply following the procedures in Section 2, Take-Apart.
3. Set the voltage selector switch to the correct input voltage.

# ImageWriter LQ

## Section 8 – Rework

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8.2	Domestic Rework
8.3	International Rework
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8.4	International Installation Procedures
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8.28	Perform Horizontal Registration Test
8.30	Rework Symptom/Cure Chart



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## □ INTRODUCTION

The ImageWriter LQ has had problems involving the print quality and the noise level. The rework procedures specifically address

- Squashed lines at top and bottom of the page
- Missing dots
- Uneven shading in graphics
- Shrill noise when printing graphics
- Excessive case vibrations

The print quality problems are improved by installing

- A new wire form assembly
- A new bottom Mylar sheet
- A new paper pan plate on the tractor assembly
- A new paper pan subassembly and springs
- New deflector stop plates, springs, and set screws

The noise-level problems are lessened by

- Installing a new ROM
- Adding sound-damping material
- Installing a redesigned platen knob

### **Domestic Rework**

Domestically, the ImageWriter LQ Rework is a complete system exchange. Printers that have serial numbers less than 1831011013 are eligible for the program. The program is appropriate for any customers who are experiencing the print quality and noise problems.

If a customer has a reworked printer and needs a logic board exchange, verify that the ROM from the customer's logic board matches the ROM in the service exchange module. If the ROM is different, install the customer's ROM into the service exchange module before installing it into the reworked printer. Refer to "Install the New ROM" in this section for instructions.

## **International Rework**

Internationally, the ImageWriter LQ is available in a kit. The ImageWriter LQ International Rework requires the following steps:

1. Removing rear and main covers
2. Installing the new ROM
3. Removing the card guide
4. Removing the tractor feed
5. Removing the platen
6. Removing the paper pan assembly
7. Installing the new deflector plates
8. Installing the new paper pan assembly
9. Installing the new deflector springs
10. Replacing the platen
11. Replacing the paper pan assembly on the tractor
12. Replacing the tractor
13. Installing the new sound-damping material
14. Replacing the rear and main covers
15. Installing the new platen knob and wire form
16. Installing the card guide
17. Performing the card guide adjustment
18. Installing the new Mylar sheet and label
19. Performing the self-test and print alignment test

## **Materials Required**

Rework kit  
Spring hook tool  
Phillips screwdriver #1 (magnetic)  
Phillips screwdriver #2 (magnetic)  
Diagonal cutters  
Jeweler's flat-blade screwdriver  
Flat-blade screwdriver #2  
Small needlenose pliers  
Macintosh Peripheral Tests diskette  
DIP switch setter  
1 sheet of 24-lb paper or special Mylar sheet for adjustment (included in the kit)

---

## □ INTERNATIONAL INSTALLATION PROCEDURES

### Remove Covers

1. Remove the paper separator and the rear cover.
2. Remove the ribbon, if present.
3. Remove the platen knob (Figure 1, #1) by pulling it to the right, away from the printer.
4. Loosen the four captive Phillips screws (Figure 1, #2) holding the main cover to the printer base.
5. Place your fingers under the opened front cover with your thumbs wrapped around the main cover. Lift the main cover up to disengage the catches from the front of the printer.

**DO NOT** pull the cover away from the printer yet.

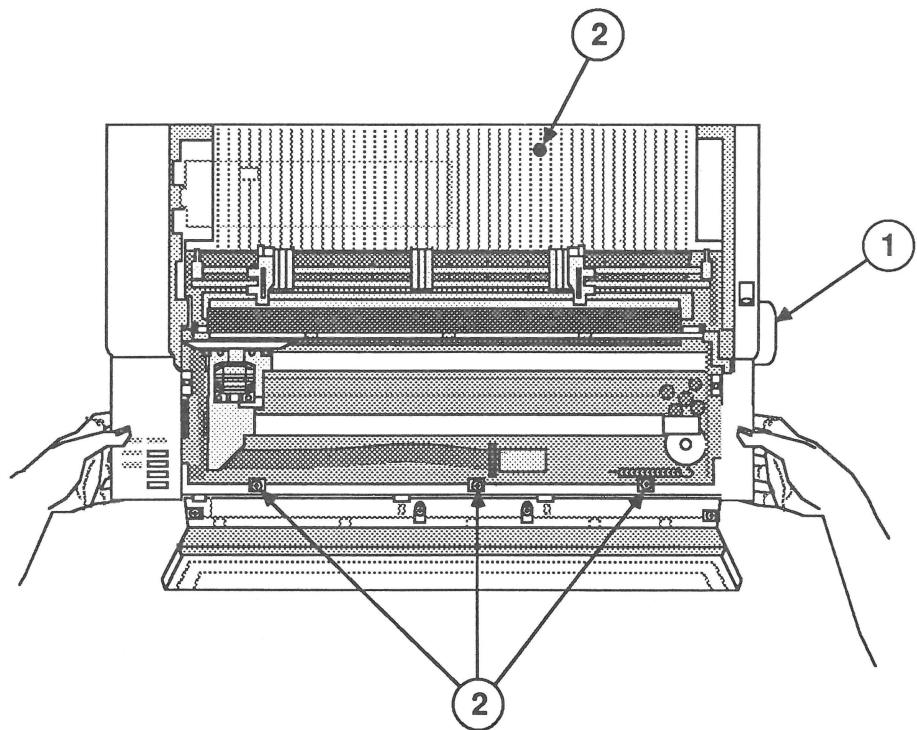
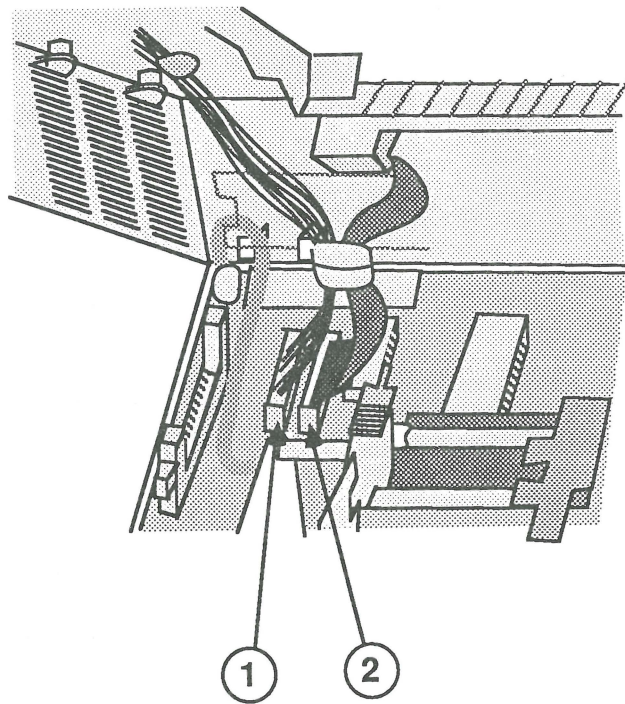


FIGURE 1

6. Pivot the front of the main cover up until you hear the catches at the rear of the cover "snap" loose from the base of the printer. Hold the cover in this position.
7. Disconnect the following cables from the main board (located at the rear of the machine):
  - Control Panel PCA cable from connector CN13 (Figure 2, #1)
  - Option Card PCA cable from connector CN15 (Figure 2, #2)



**FIGURE 2**

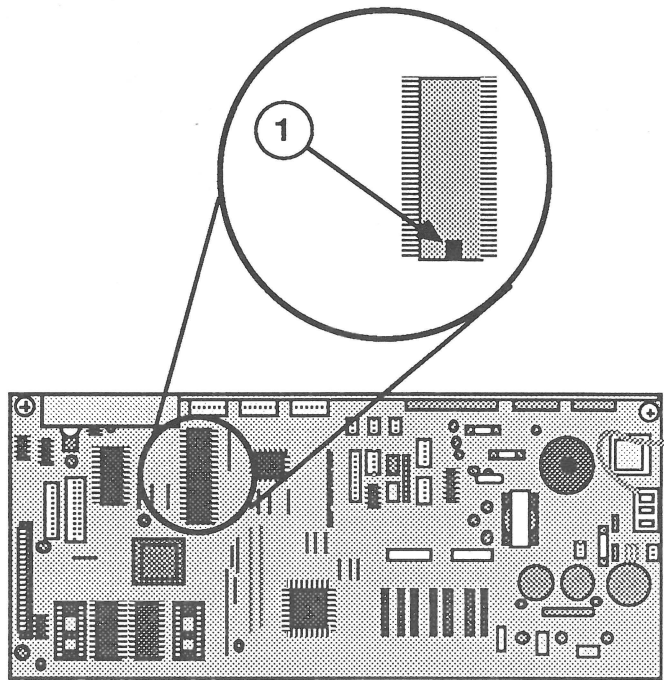
## Install New ROM

1. Using ESD precautions and a jeweler's flat-blade screwdriver, remove the ROM chip below.

---

**WARNING:** ROM chips are susceptible to ESD damage. To prevent ESD damage, follow the precautions outlined for ESD prevention in **You Oughta Know**.

---

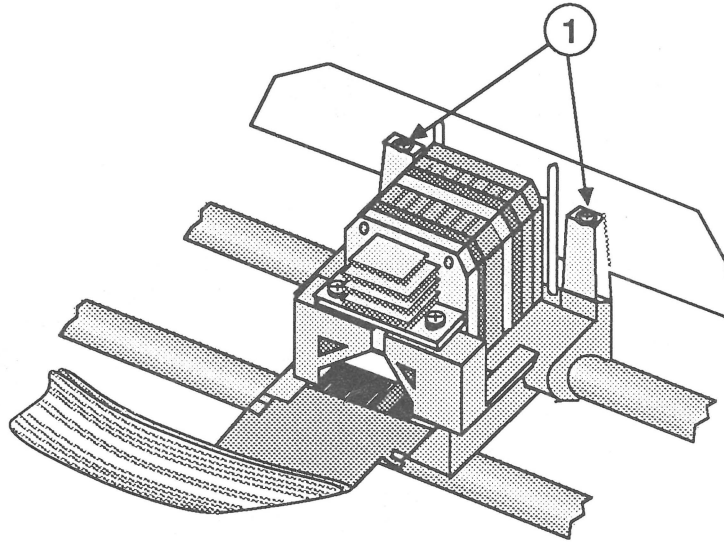


**FIGURE 3**

2. Position the new ROM so the notch faces the front of the printer and the legs are lined up with the socket (Figure 3, #1). Gently push the new ROM into the socket.

## Remove Card Guide

1. Move the paper thickness lever to position 5.
2. Remove the two Phillips screws that secure the card guide to its two mounting posts (Figure 4, #1).

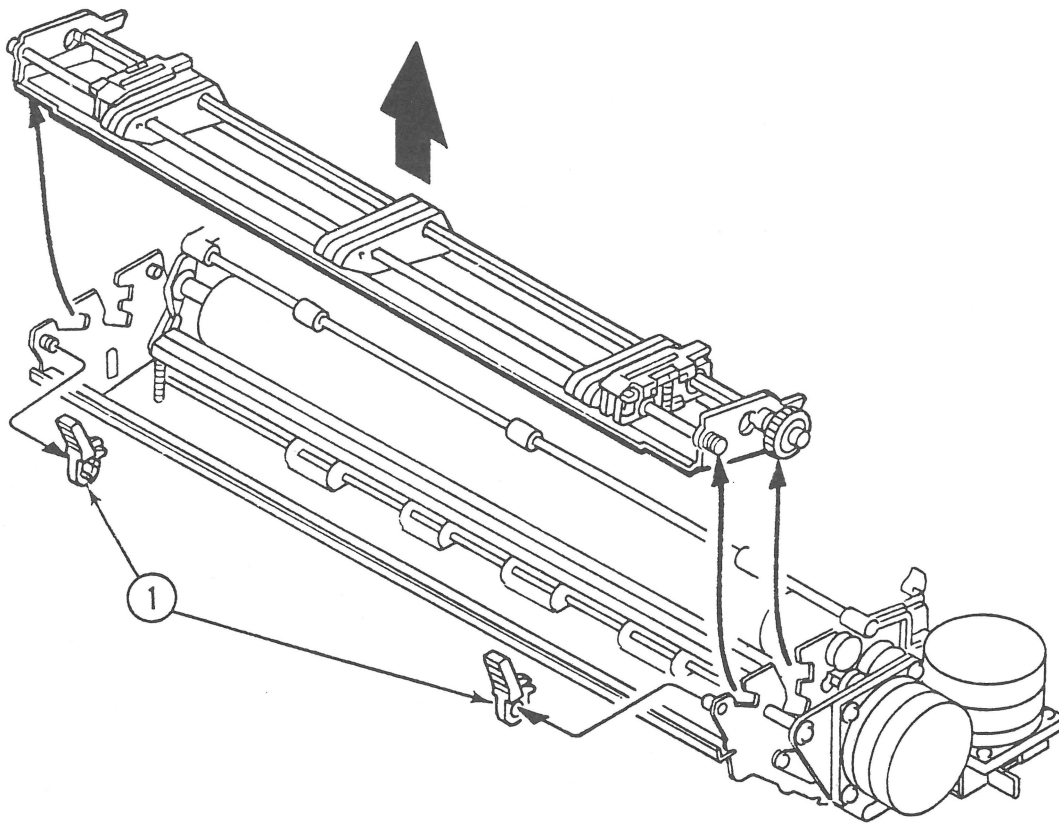


**FIGURE 4**

3. Lift the card guide up and out of the printer.

## Remove Tractor Assembly

1. Locate and push back the blue tractor levers, both right and left (Figure 5, #1), to release the tractor assembly.

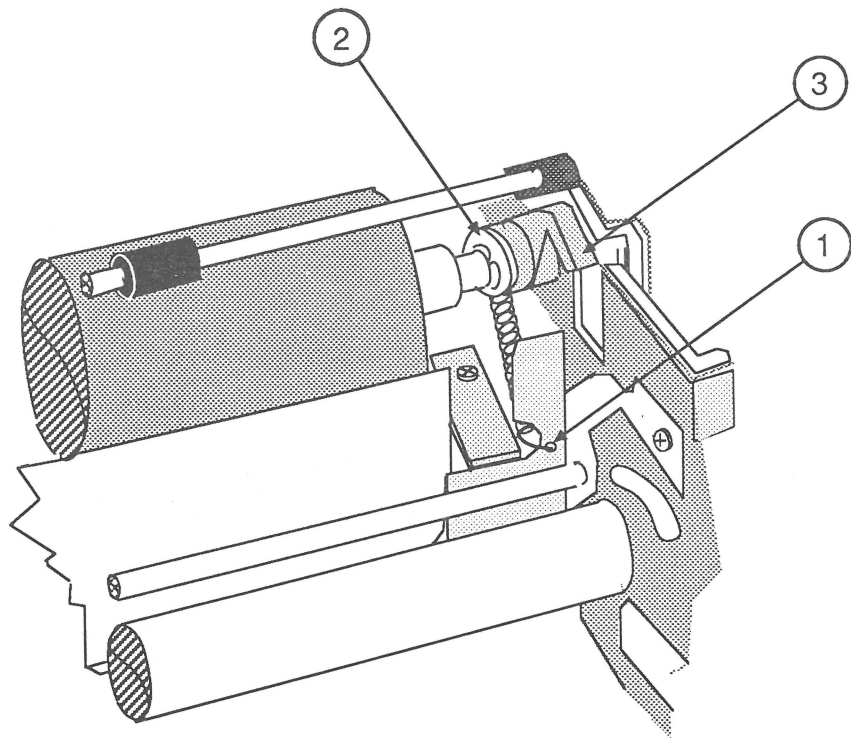


**FIGURE 5**

2. Remove the tractor levers by placing your thumb on the metal cylinder and your forefinger on the tractor lever and pushing the lever toward the center of the printer. Removing the levers will require a bit of pressure, but don't worry; you won't break the lever.
3. Remove the tractor by first pressing it toward the rear of the printer and then lifting up and out.

## Remove Platen

1. Move the carrier assembly to the center of the printer.
2. Open the paper bail by lifting it away from the platen.
3. Disconnect the left and right springs (Figure 6, #1) between the gap adjustment cams and the paper guide plate. Leave the spring attached to the lever assembly.
4. Using the needlenose pliers or the jeweler's flat-blade screwdriver, remove the E-rings (Figure 6, #2) on the left and right gap adjustment cams.

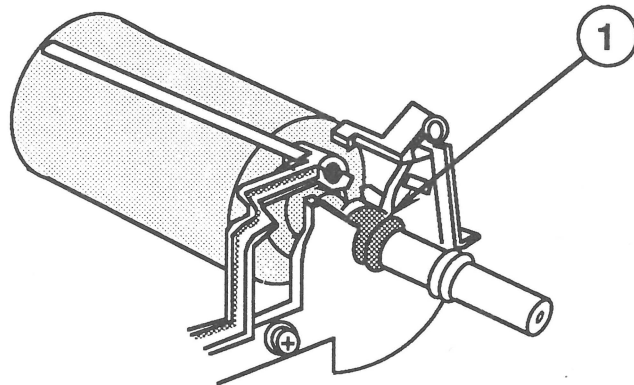


**FIGURE 6**

5. Move the left and right gap adjustment cams (Figure 6, #3) inward, toward the platen.

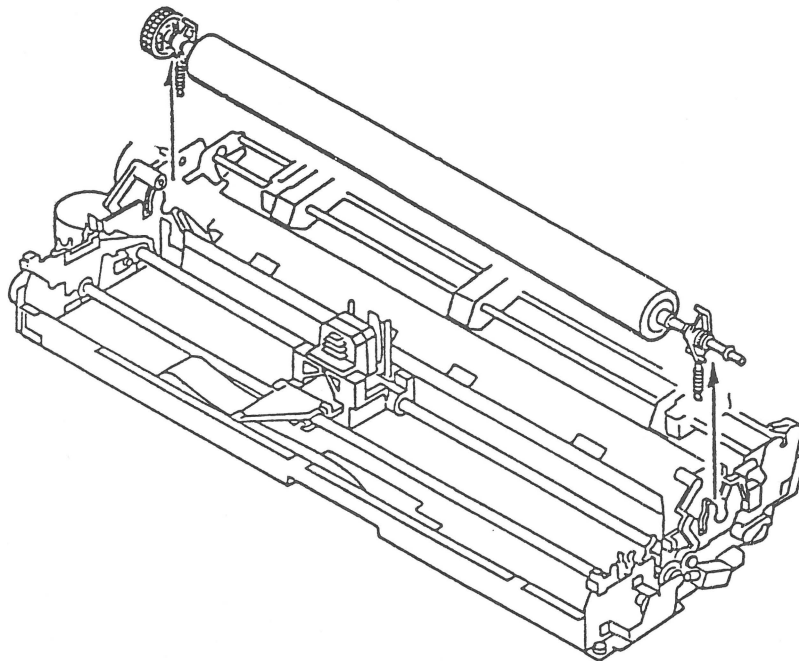


6. Using the flat-blade screwdriver, move the platen catches (Figure 7, #1) inward, toward the platen.



**FIGURE 7**

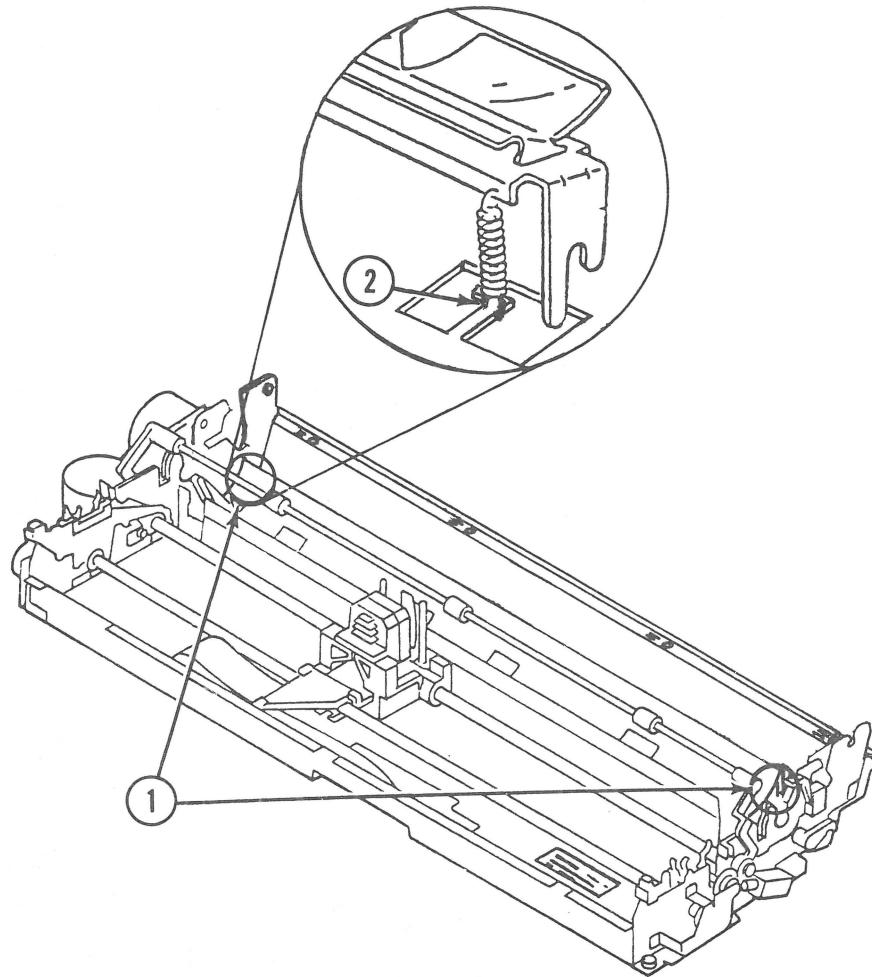
7. Lift the platen up on the right side until it clears the cut sheet feeder lever and printer frame (Figure 8).
8. Lift out the left side until it clears the gear assembly (Figure 8). Set the platen aside.



**FIGURE 8**

**Remove  
Paper Pan  
Subassembly**

1. Locate the two springs on the paper pan subassembly (Figure 9, #1).



**FIGURE 9**

2. Using the spring hook, unhook the left and right springs (Figure 9, #2), and lift the paper pan subassembly and the springs from the machine. This subassembly will be completely replaced.

### Install New Deflector Plates and Stop Plate Springs

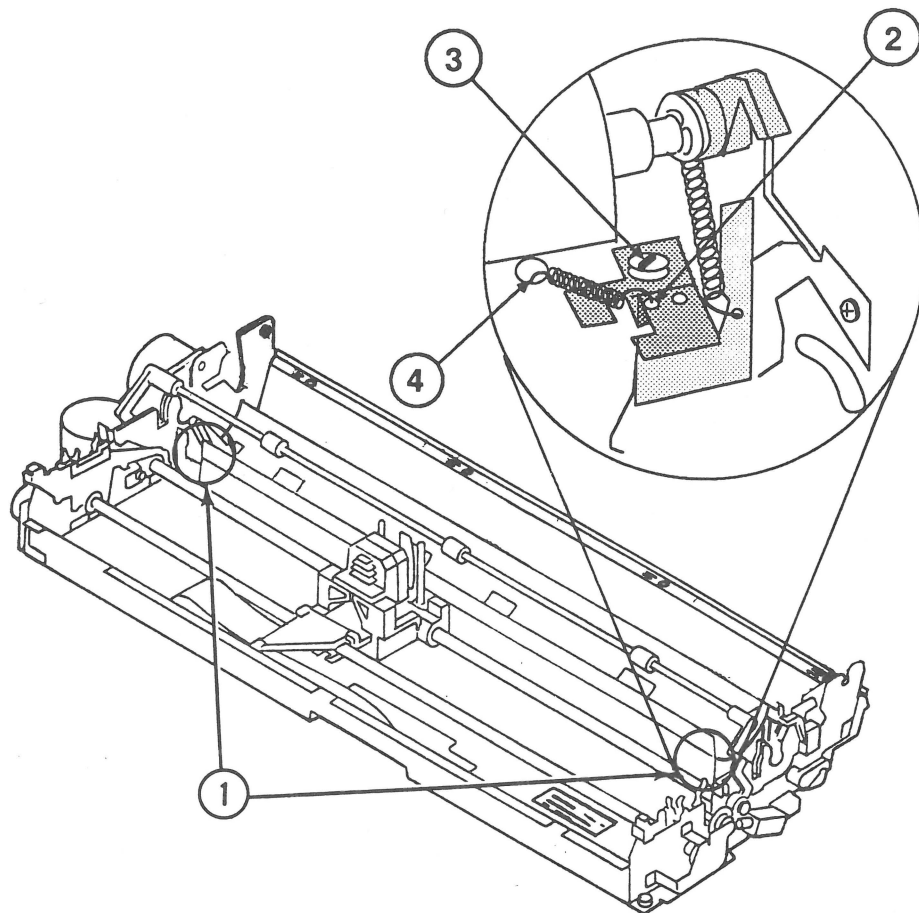
1. Locate and remove the Phillips screws that hold deflector stop plates (Figure 10, #1) on both the right and left sides of the paper guide plate. Discard the old screws and stop plates.
2. Attach one end of the new spring to the new left deflector plate (Figure 10, #2).

---

**WARNING:** When positioning the stop plate on to the mechanism, **DO NOT TIGHTEN THE SCREW**. There should be some play in the plate.

---

3. Position the new left deflector plate, and screw in the set screw (Figure 10, #3). Do not tighten the screw.
4. Connect the other end of the spring to the round hole in the paper guide plate (Figure 10, #4).

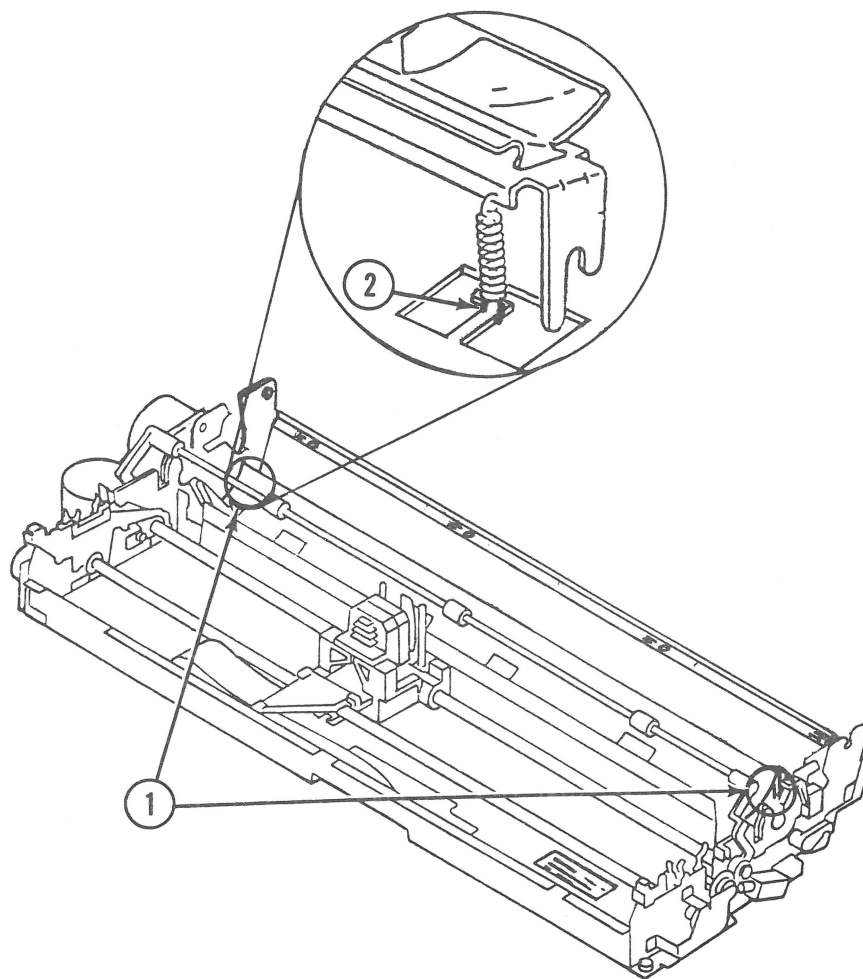


**FIGURE 10**

5. Repeat steps 1 through 4 for the right side.

**Install New  
Paper Pan  
Subassembly**

1. Connect the new paper cradle springs, one to each end of the new paper pan subassembly (Figure 11, #1).

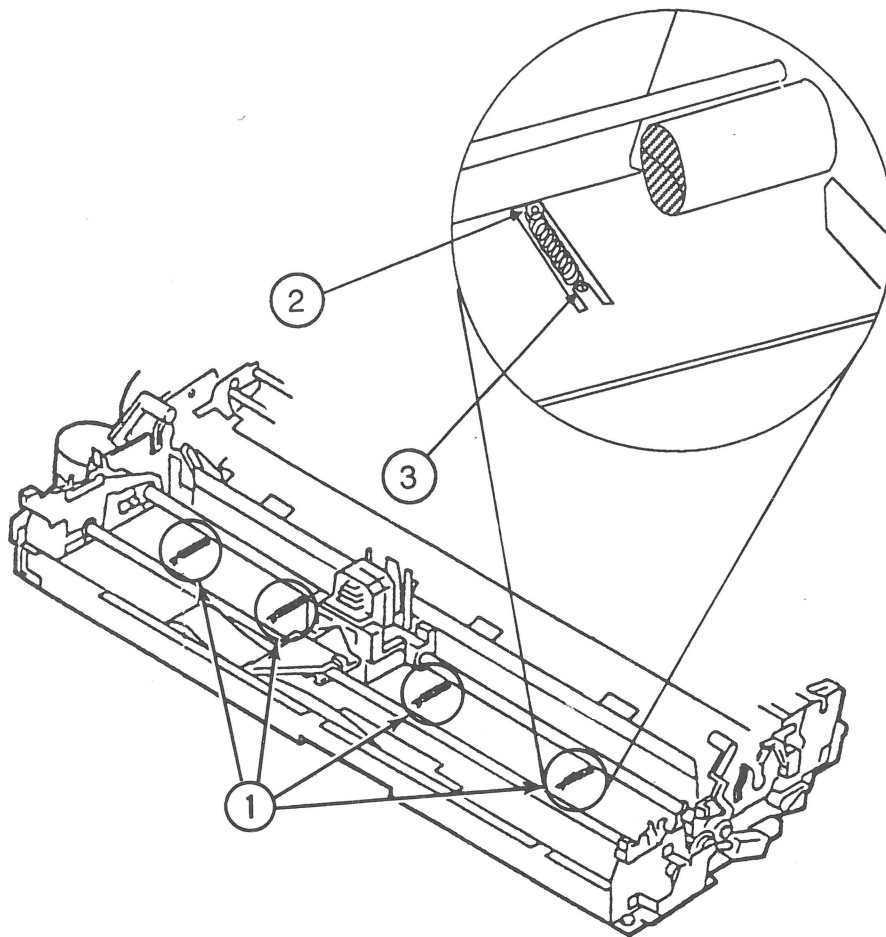


**FIGURE 11**

2. Install the new paper pan subassembly into the machine. Attach the springs to the small extension on the paper guide plate (Figure 11, #2).

### Install New Paper Deflector Springs

1. Locate the four paper deflector springs (Figure 12, #1). Remove them using needlenose pliers or cut them out.



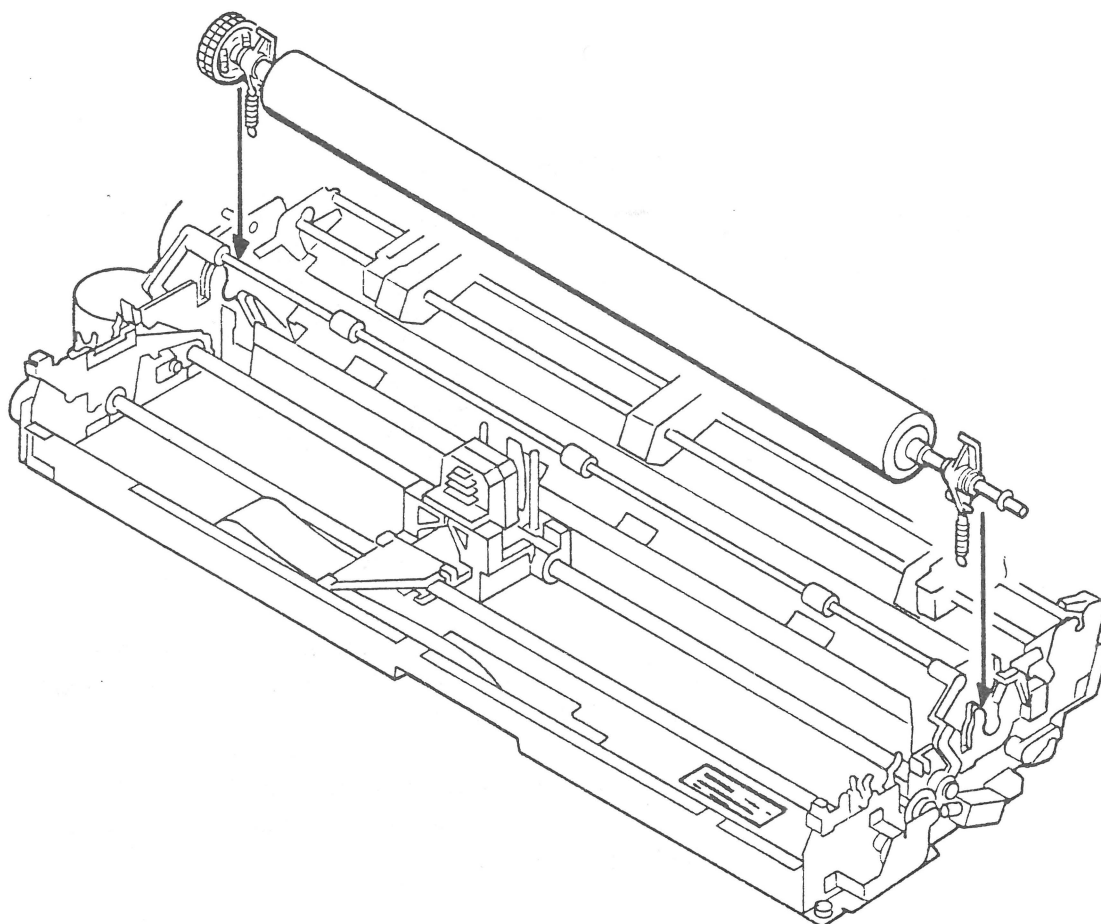
**FIGURE 12**

**Note:** The hook on the spring that connects to the paper deflector (Figure 12, #2) needs to face upward. The hook on the spring that connects to the mechanism needs to face down (Figure 12, #3).

2. Using needlenose pliers, install the four new paper pan springs by attaching one end to the paper deflector (Figure 12, #2) and the other to the mechanism (Figure 12, #3).

## Replace Platen

1. Place the platen assembly in the mechanical assembly (Figure 13).



**FIGURE 13**

2. Move the left and right platen catches (Figure 14, #1) outward until they engage fully with the platen holder.

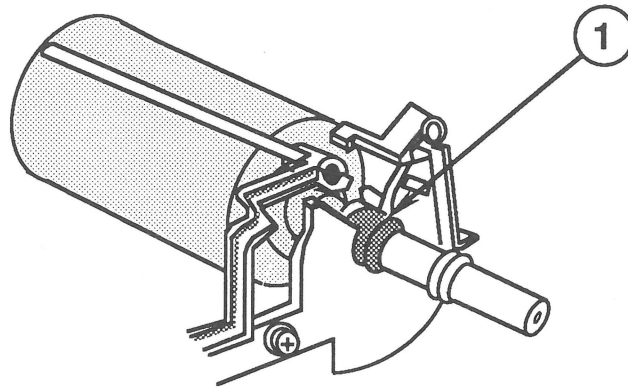


FIGURE 14

3. Snap the left and right gap adjustment cam E-rings into place (Figure 15, #2). Make sure the metal washer is **behind** the E-ring.
4. Attach the left and right springs (Figure 15, #1) between the gap adjustment cams and the paper guide plate.

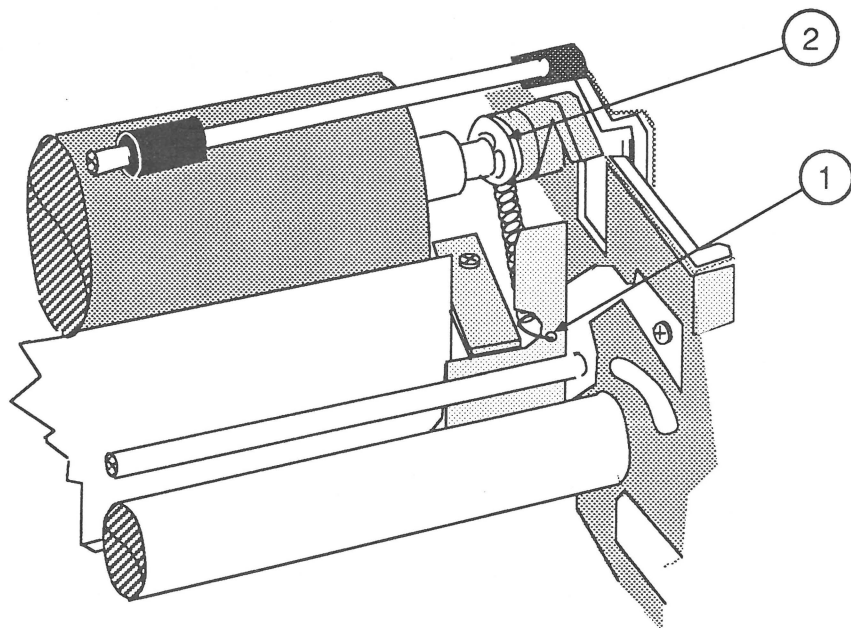
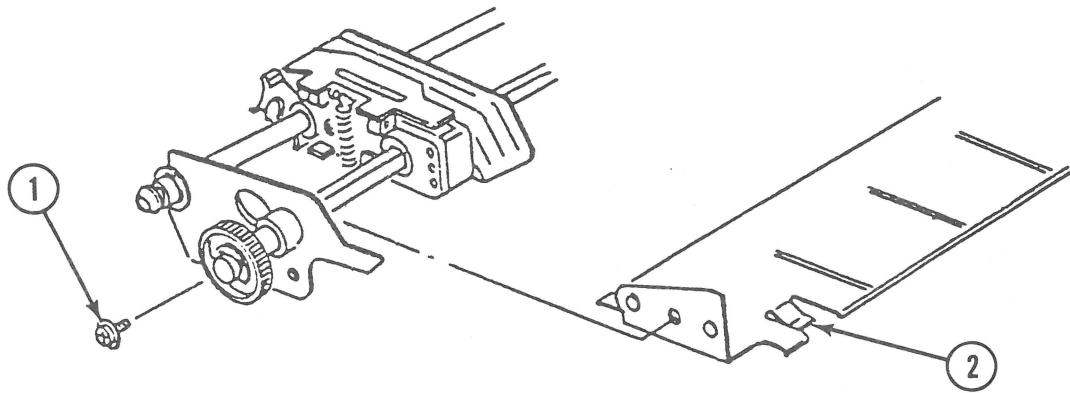


FIGURE 15

### Install New Paper Pan on Tractor Assembly

1. Remove the screws (Figure 16, #1), right and left, that hold the paper pan to the tractor assembly.



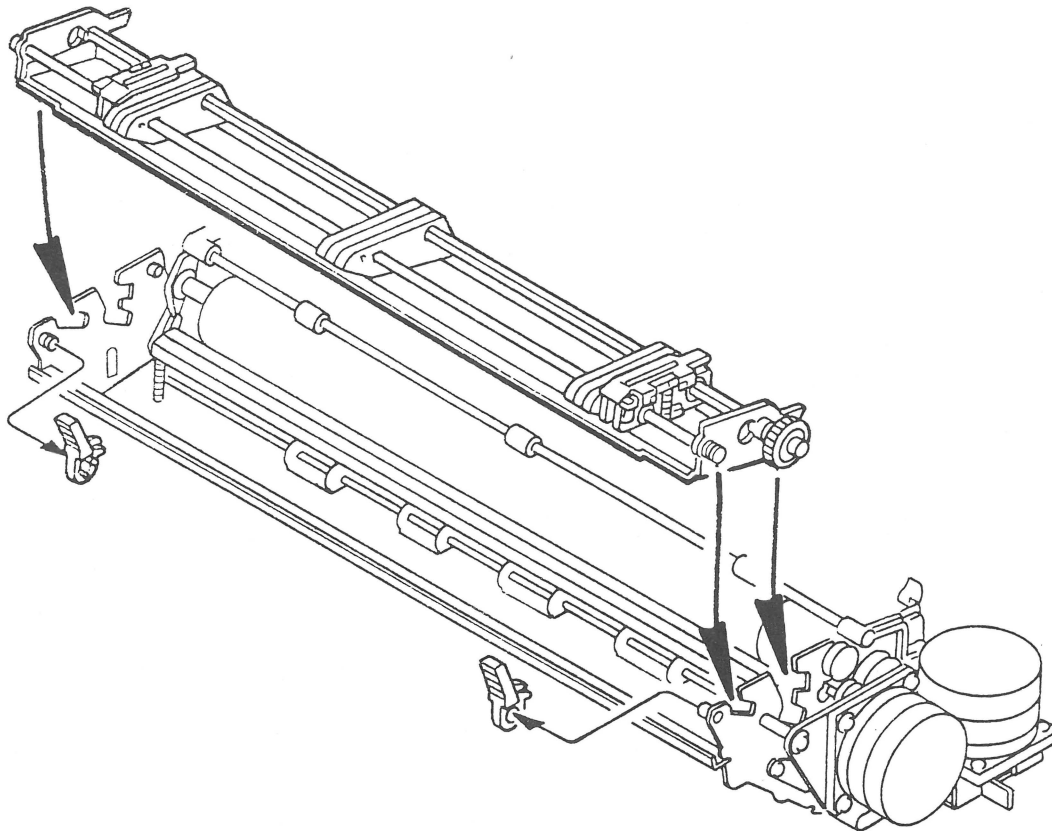
**FIGURE 16**

2. Position the new paper pan so that the lip (Figure 16, #2) is on the end of the tractor assembly that has a gear.
3. Replace the screws, right and left, into the center hole on the tractor unit. The screws hold the paper pan in place.



**Replace  
Tractor  
Assembly**

1. Align the four posts on either side of the tractor assembly with the slots in the mechanical assembly (Figure 17), and lower the tractor assembly into position.

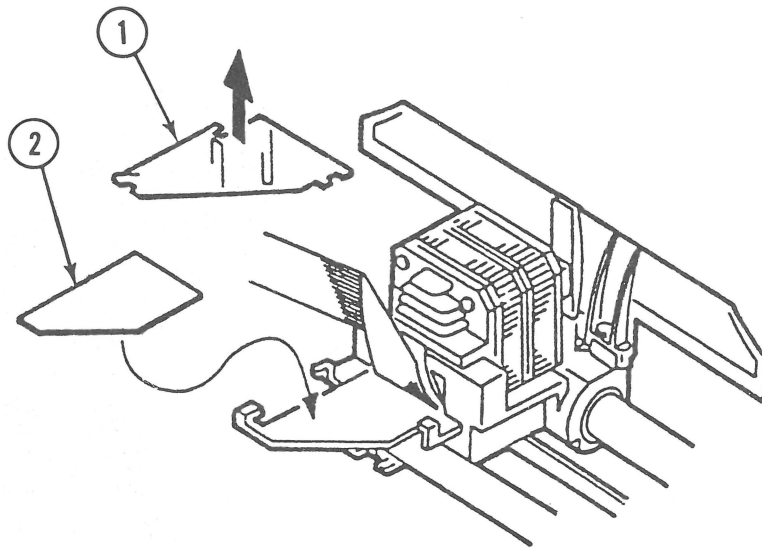


**FIGURE 17**

2. Snap the left and right blue tractor levers into place.

**Install  
Sound-Damping  
Material**

1. Remove the plastic protector (Figure 18, #1) from the print head relay cable.
2. Wipe clean the area under the print head relay cable to ensure that it is free of dirt and oil.
3. Remove the backing, and position the damping material (Figure 18, #2) in the center of the flat area on the carriage assembly. Press down firmly.



**FIGURE 18**

4. Replace the plastic protector (Figure 18, #1).

## Replace Covers

1. Position the main cover so that it is standing up behind the printer.
2. Tilt the main cover forward slightly, and connect the two cables from the main cover to the main board:
  - Control Panel PCA cable to connector CN13 (Figure 19, #1)
  - Option Card PCA cable to connector CN15 (Figure 19, #2)

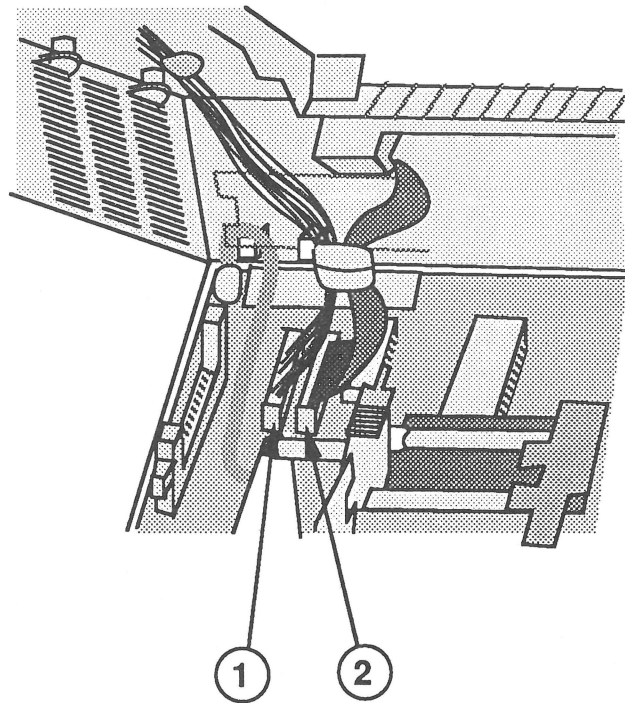
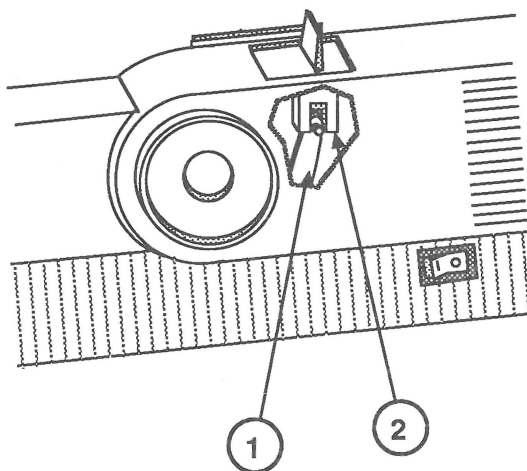


FIGURE 19

3. Hold the main cover by its sides. Lower the cover onto the base of the printer, back first.

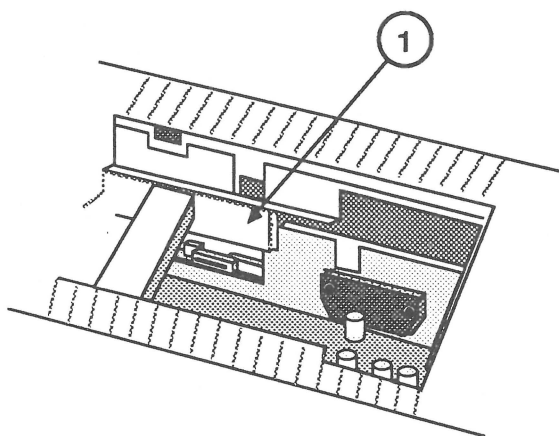
As you lower the cover, watch the following:

- a) The paper-feed arm (Figure 20, #1) should be engaged in the paper-feed lever (Figure 20, #2).



**FIGURE 20**

- b) The plastic divider in the option card compartment should be in front of the power supply heat sink (Figure 21, #1).



**FIGURE 21**

4. Partially screw in the four captive Phillips screws that secure the main cover to the bottom cover. Then tighten the screws.

#### **Install New Platen Knob and Wire Form Assembly**

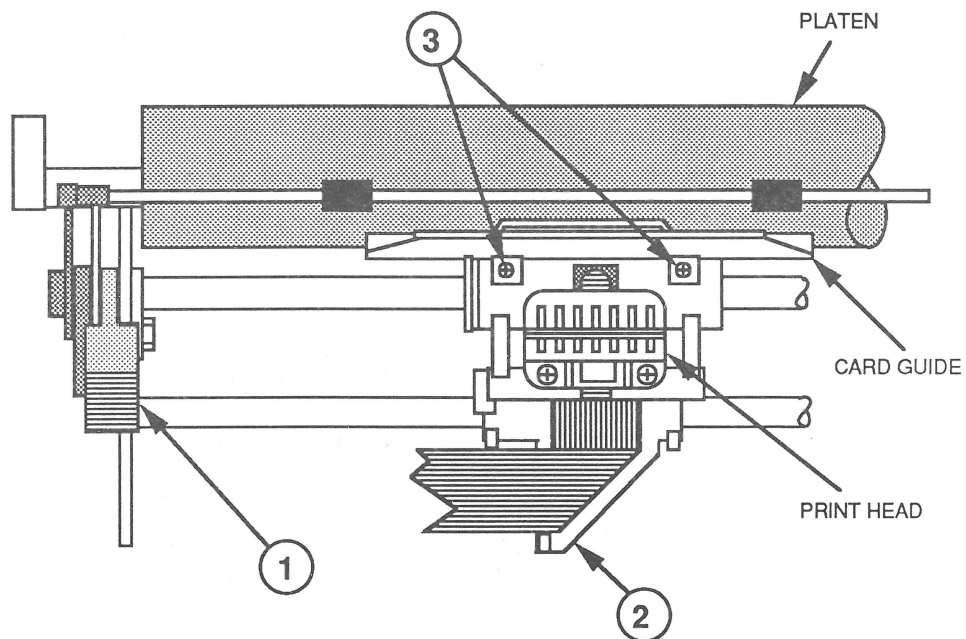
1. Install the new platen knob on the right side of the printer.
2. Replace the rear cover.
3. Install the new wire form assembly inside the rear cover.

#### **Install Card Guide**

1. Slide the card guide over its two mounting posts.
2. Install, but **don't tighten**, the two Phillips screws that secure the card guide to the mounting posts.

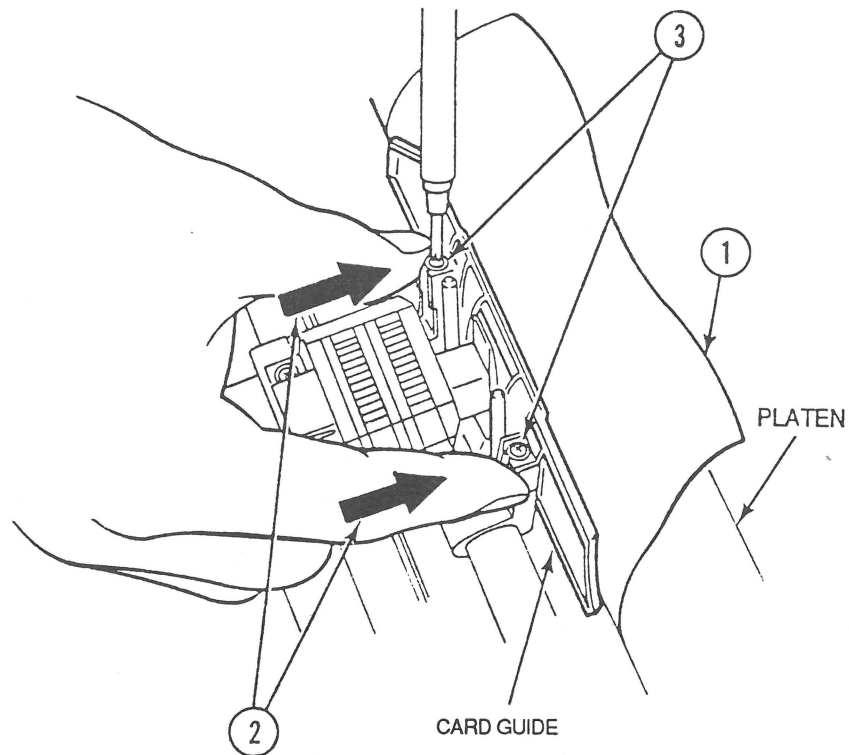
**Perform  
Card Guide  
Adjustment**

1. Push the paper thickness lever (Figure 22, #1) toward the back of the printer, to the number-one position.
2. Be sure the power is off.
3. Move the carrier assembly (Figure 22, #2) to the center of the printer.
4. Loosen the two set screws that hold the card guide (Figure 22, #3).



**FIGURE 22**

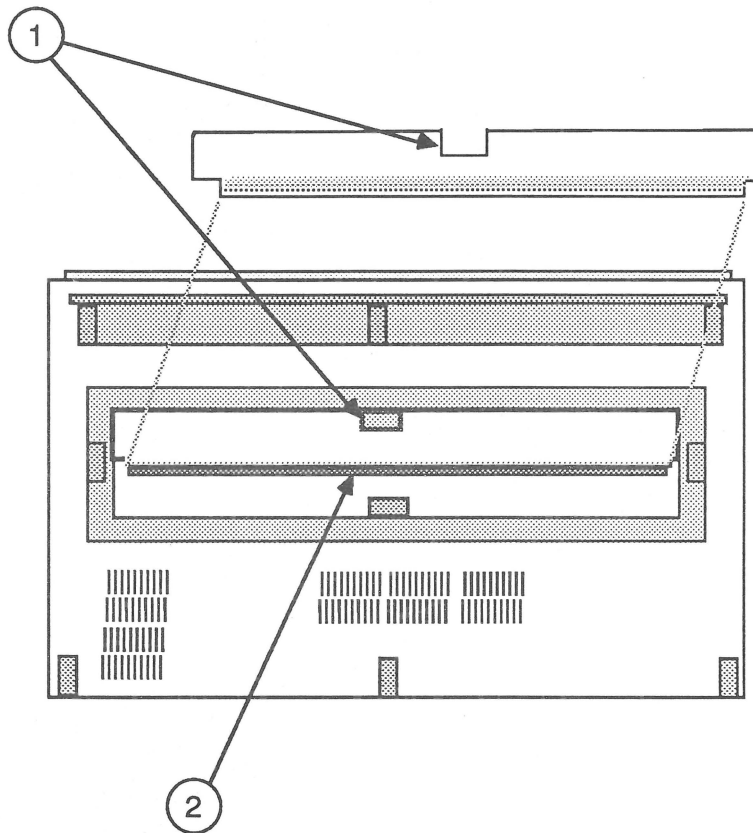
5. Roll the 24-lb sheet of paper or the Mylar adjustment sheet between the card guide and the platen (Figure 23, #1).
6. Gently push forward on the card guide until it stops against the paper (Figure 23, #2).
7. While holding the card guide in position, tighten the two set screws (Figure 23, #3) that hold it in position.



**FIGURE 23**

**Install New  
Bottom Mylar  
Sheet and Label**

1. Gently place the printer top-down on foam padding.
2. Position the Mylar so the notch fits securely around the rubber foot. The Mylar has to fold over into the slot for the paper feed (Figure 24, #1).

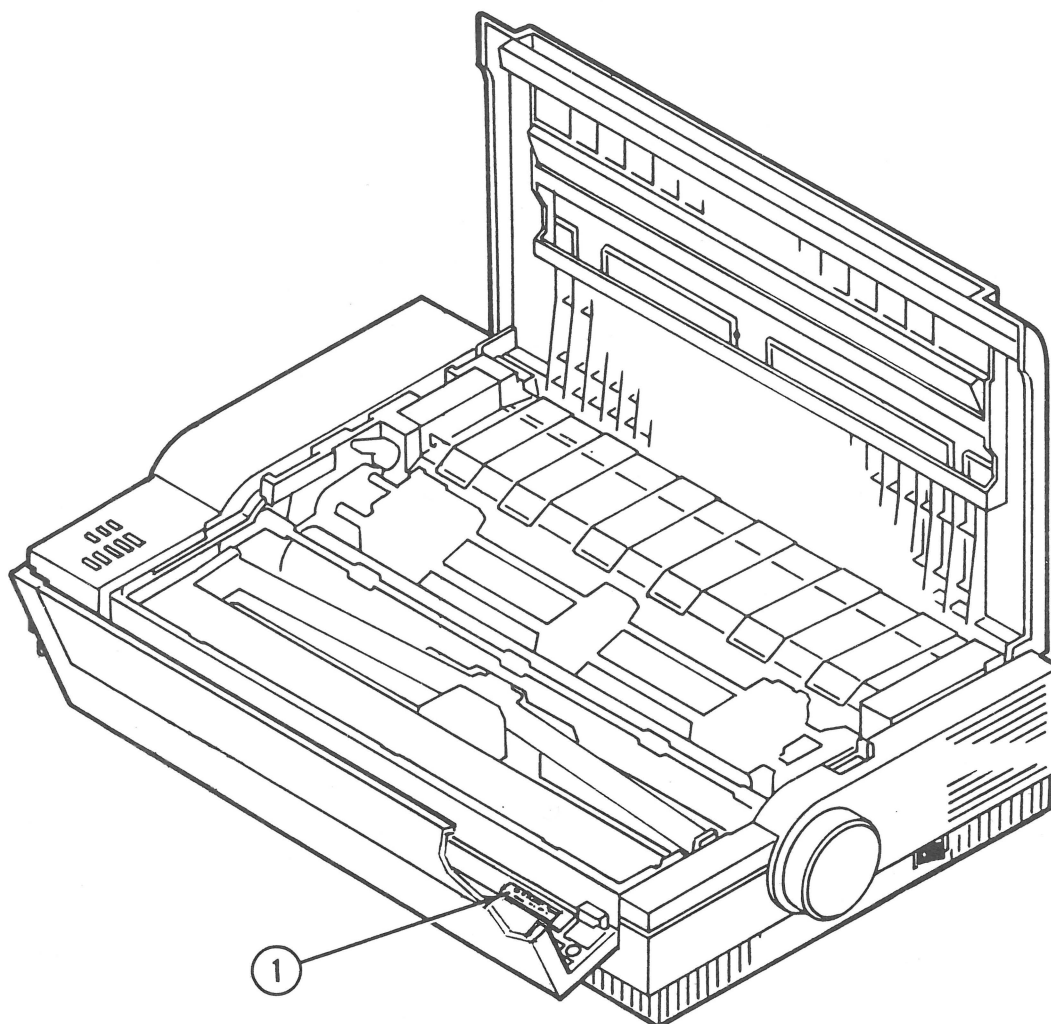


**FIGURE 24**

3. Smooth the Mylar onto the case and into the slot (Figure 24, #2) for the bottom paper feed.



4. Position the rework label on the right side (Figure 25, #1) of the front cover.



**FIGURE 25**

5. Replace the ribbon cassette.

## Perform Self-Test

1. Install paper into the printer.
2. Press down the form feed and hold it down while turning on the printer. Release the form feed. The printer should print the ROM revision, DIP switch settings, and a continuous form of characters.

If the printer does not print, turn to the Rework Symptom/Cure Chart at the end of this section.

3. Turn the power switch off to terminate the test.

**Perform  
Horizontal  
Registration Test**

The horizontal registration test is done to ensure the proper placing of the characters horizontally and vertically on the printout of any page. Uneven print alignment can be corrected by selecting the appropriate DIP switches.

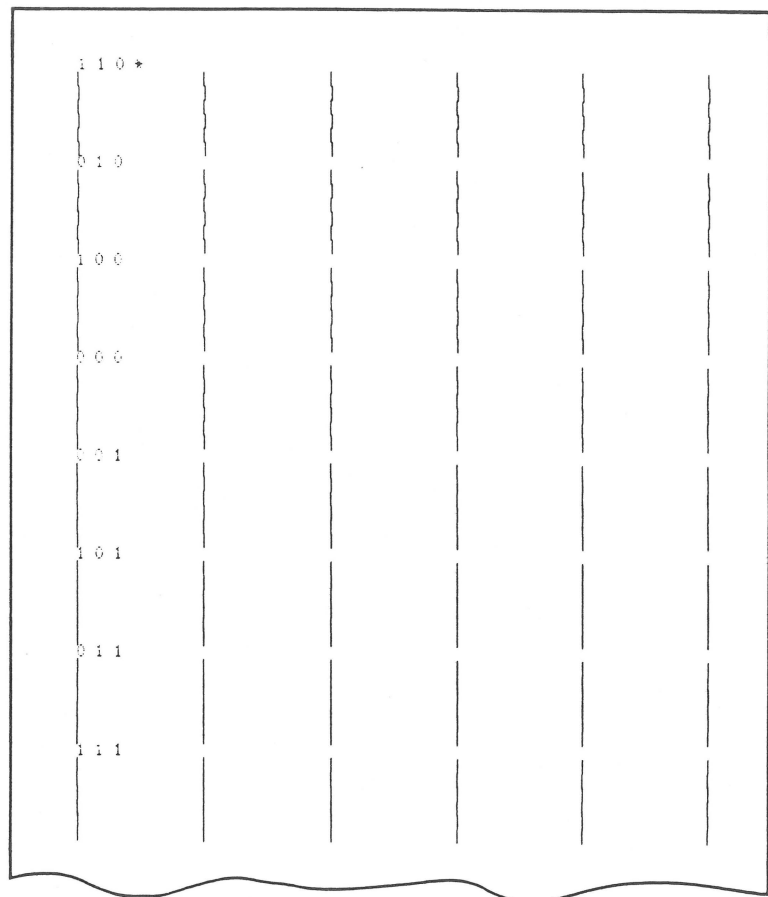
1. Perform the Horizontal Registration Test on the *Macintosh Peripheral Tests* diskette. Refer to Section 5, Diagnostics, for complete information.
2. Be sure the power is off.
3. Check the printout, and select the best horizontal registration.
4. Using Tables 1 and 2, and Figure 26, set DIP switches 3-6, 3-7, and 3-8 according to the best registration selected on the printout. (1 = On; 0 = Off.)
5. Repeat steps 1 through 4 until the correct DIP switches are set for the best horizontal registration.

**TABLE 1**

DIP Sw 3-6	DIP Sw 3-7	DIP Sw 3-8	Amount of left movement (mm)
ON	ON	OFF	+ 0.159
OFF	ON	OFF	+ 0.106
ON	OFF	OFF	+ 0.053
OFF	OFF	OFF	+ 0.000

**TABLE 2**

DIP Sw 3-6	DIP Sw 3-7	DIP Sw 3-8	Amount of right movement (mm)
OFF	OFF	ON	- 0.044
ON	OFF	ON	- 0.088
OFF	ON	ON	- 0.132
ON	ON	ON	- 0.176



**FIGURE 26**

---

## □ REWORK SYMPTOM/CURE CHART

For additional troubleshooting information refer to *Section 4, Troubleshooting*.

### Symptom

### Cure

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• <i>Powers on, but no carrier movement</i></li><br/><li>• <i>Print density gets lighter or darker from one end of the line to the other</i></li><br/><li>• <i>Powers on, but no carrier movement</i></li></ul> | <ul style="list-style-type: none"><li>– Verify that the new ROM is inserted with the notch toward the front of the printer.</li><br/><li>1. Perform the "Print Head Gap Adjustment." (Refer to Section 3, Adjustments.)<br/>2. Perform the "Platen Gap and Parallelism Adjustment." (Refer to Section 3, Adjustments.)</li><br/><li>– Verify that the new ROM is inserted with the notch toward the front of the printer case.</li></ul> |
|---|--|

# ImageWriter LQ

## Illustrated Parts List

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### □ CONTENTS

IPL.2	Miscellaneous Hardware Kit
IPL.3	Rework Kit—Revised
IPL.5	Assembly Location (Figure 1)
IPL.7	Top Cover Assembly (Figure 2)
IPL.9	Tractor Feed Assembly (Figure 3)
IPL.11	Platen Assembly (Figure 4)
IPL.13	Print Head/Carriage Assembly (Figure 5)
IPL.15	Main Frame Assembly (Figure 6)
IPL.17	Left Side Frame Assembly (Figure 7)
IPL.19	Right Side Frame Assembly (Figure 8)
IPL.21	Power Supply and Main PCB Assembly (Figure 9)
IPL.23	Main Board Fuses (Figure 10)
IPL.25	Cables (Figure 11)
IPL.27	Paper Pan Subassembly (Figure 12)
IPL.29	Wire Form Assembly (Figure 13)
IPL.31	Tool (Figure 14)

The figures and lists above include all piece parts that can be purchased separately from Apple for the ImageWriter LQ, along with their part numbers. Refer to the *Apple Service Programs* manual price pages for part number availability in your area.

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## ❑ MISCELLANEOUS HARDWARE KIT

<u>Part No.</u>	<u>Description</u>
076-0262	Miscellaneous Hardware Kit

Parts listed below are included in the ImageWriter LQ Miscellaneous Hardware Kit. The quantities listed are included in the kit.

Parts listed with a part number are available separately. If ordering these parts separately, see the *Apple Service Programs* manual for quantities and prices. Parts listed without a part number are not sold separately.

<u>Part No.</u>	<u>Description</u>	<u>See Figure #</u>
—	Friction Release Lever (2/pk)	2
956-0016	Platen Knob (without ribs)	2
952-0012	Case Top Magnet (2/pk)	2
—	Spacer, Tractor Idler Shaft (2/pk)	3
—	Timing Belt Retainer (2/pk)	5
—	Rubber Grommet (2/pk)	6 & 7
—	Gap Lever Cap (2/pk)	7
—	Tractor Lever Lock, LH (2/pk)	7
—	Tractor Lever Lock, RH (2/pk)	8
076-0273	Rubber Foot (2/pk)	9
—	Screw, Sems w/Flat Washer, 2.6 x 6mm (4/pk)	Various
—	Screw, Flanged, 3 x 4mm (2/pk)	Various
—	Screw, Sems w/Flat Washer, 3 x 12mm (2/pk)	Various
—	Screw, Shoulder, 4 x 15mm (2/pk)	Various
076-0325	Screw, Double Sems 4 x 8 (4/pk)	Various
076-0292	Screw, Double Sems 3 x 10 (6/pk)	Various
076-0293	Screw, Double Sems 3 x 6 (4/pk)	Various

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## □ REWORK KIT—REVISED

<u>Part No.</u>	<u>Description</u>
652-0600	Rework Kit—Revised*

**\*Note:** The Revised Rework Kit, as a kit, is available only to Apple International at this time. Some parts included in the Rework kit are available in the U.S. by ordering them separately by part number. Some parts without part numbers are available in the U.S. as part of the Paper Pan Subassembly. See the *Apple Service Programs* manual for quantities and prices.

<u>Part No.</u>	<u>Description</u>	<u>See Figure #</u>
—	Paper Pan (A) <sup>1</sup>	12
—	Paper Pan Mylar <sup>1</sup>	12
—	Platen Cradle Mylar <sup>1</sup>	6, 12
—	Paper Table <sup>1</sup>	12
—	Wire Form <sup>2</sup>	13
—	Paper Separator <sup>2</sup>	13
—	Masked ROM, IC <sup>2</sup>	—
—	Disk, HyperCard Stack & Drive <sup>2</sup>	—
076-0344	Paper Deflector Spring, (4/pk)	6
076-0345	Deflector Stop Plate, Left	6
076-0346	Deflector Stop Plate, Right	6
076-0347	Tool, Spring Remover/Install	14
931-0026	Set Screws, (2/pk)	6
948-0042	Paper Pan Subassembly	12
948-0043	Wire Form Assembly	13
948-0046	Paper Pan (B)	3
949-0242	Sound-Damping Material	5
956-0016	Platen Knob w/o Ribs	2
957-0054	Platen Cradle Spring, (2/pk)	6
957-0055	Paper Pan Spring, (2/pk)	6, 12
958-0013	Mylar, Bottom	1
958-0015	E-Ring, E-4, (2/pk)	7
958-0016	E-Ring, E-6, (2/pk)	4
958-0017	Mylar, Paper Guide Adjustment	—

1. Included in Paper Pan Subassembly
2. Available only in Revised Rework Kit



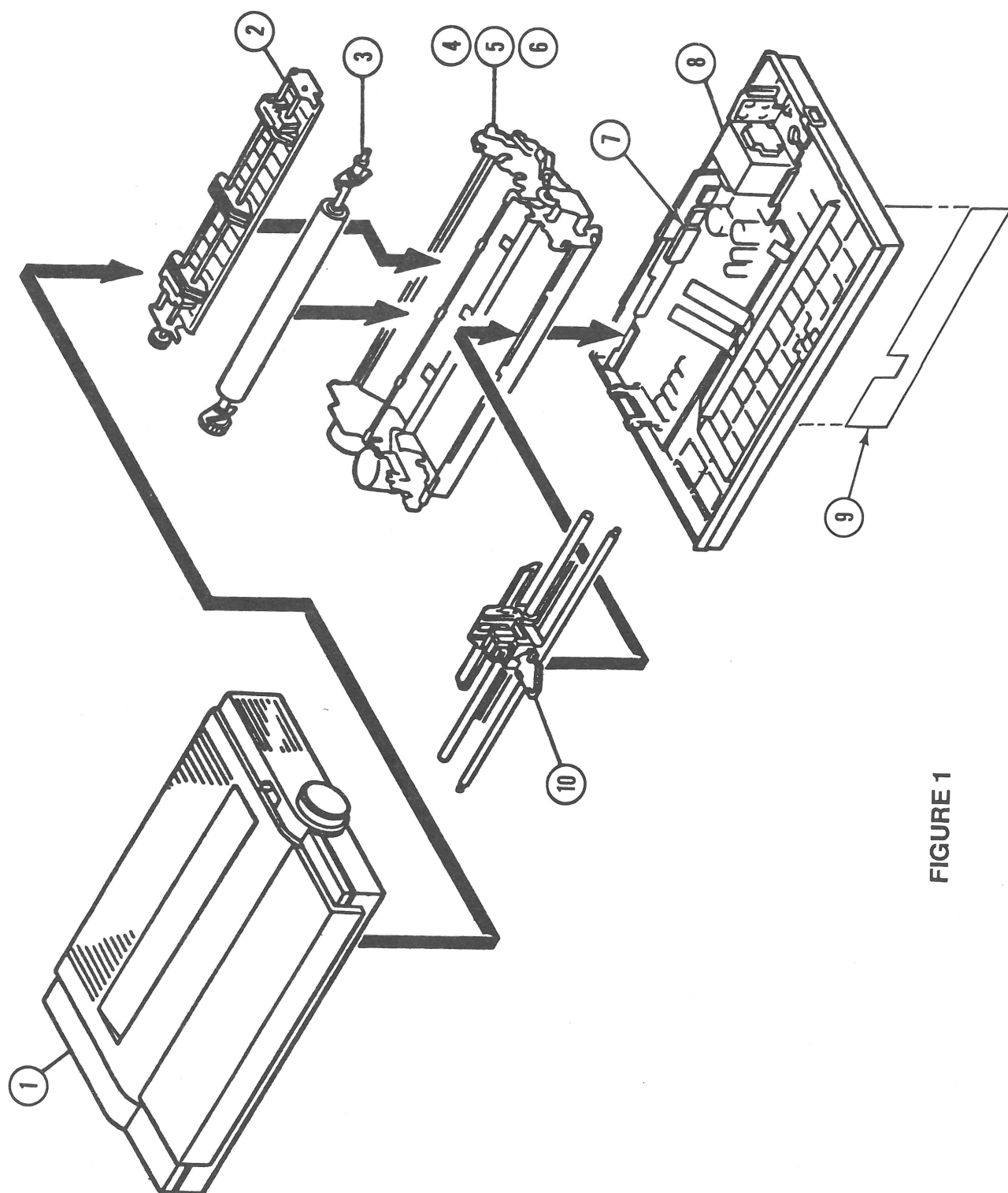


FIGURE 1

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## □ ASSEMBLY LOCATION (Figure 1)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1		Top Cover Assembly
2	—	Tractor Feed Assembly
3	—	Platen Assembly
4	—	Main Frame Assembly
5	—	Left Side Frame Assembly
6	—	Right side Frame Assembly
7	—	Main PCB Assembly
8	—	Power Supply and Main PCB Assembly
9	958-0013	Bottom Mylar*
10	—	Print Head/Carriage Assembly

\*Included in Rework Kit. Also sold separately.

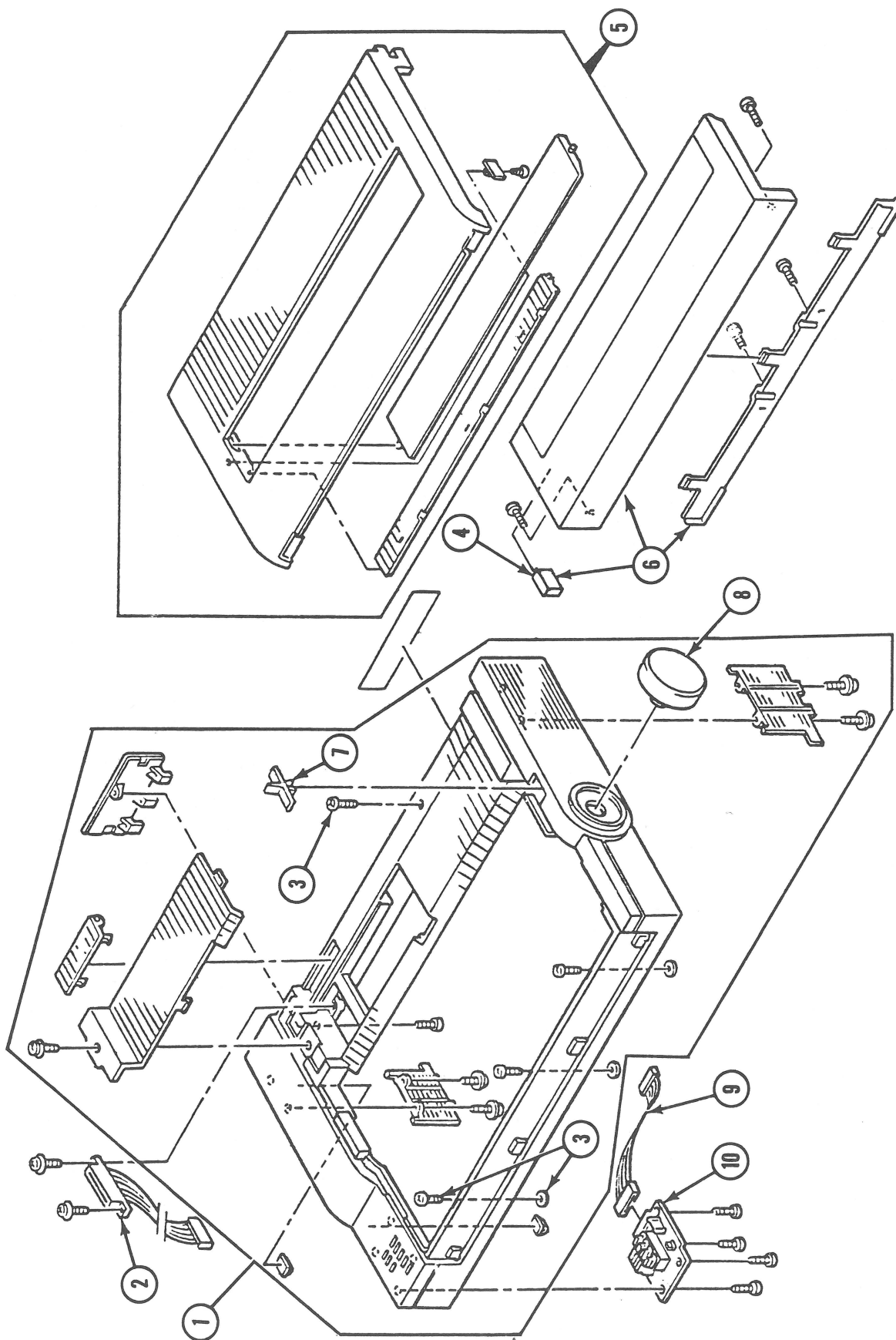


FIGURE 2

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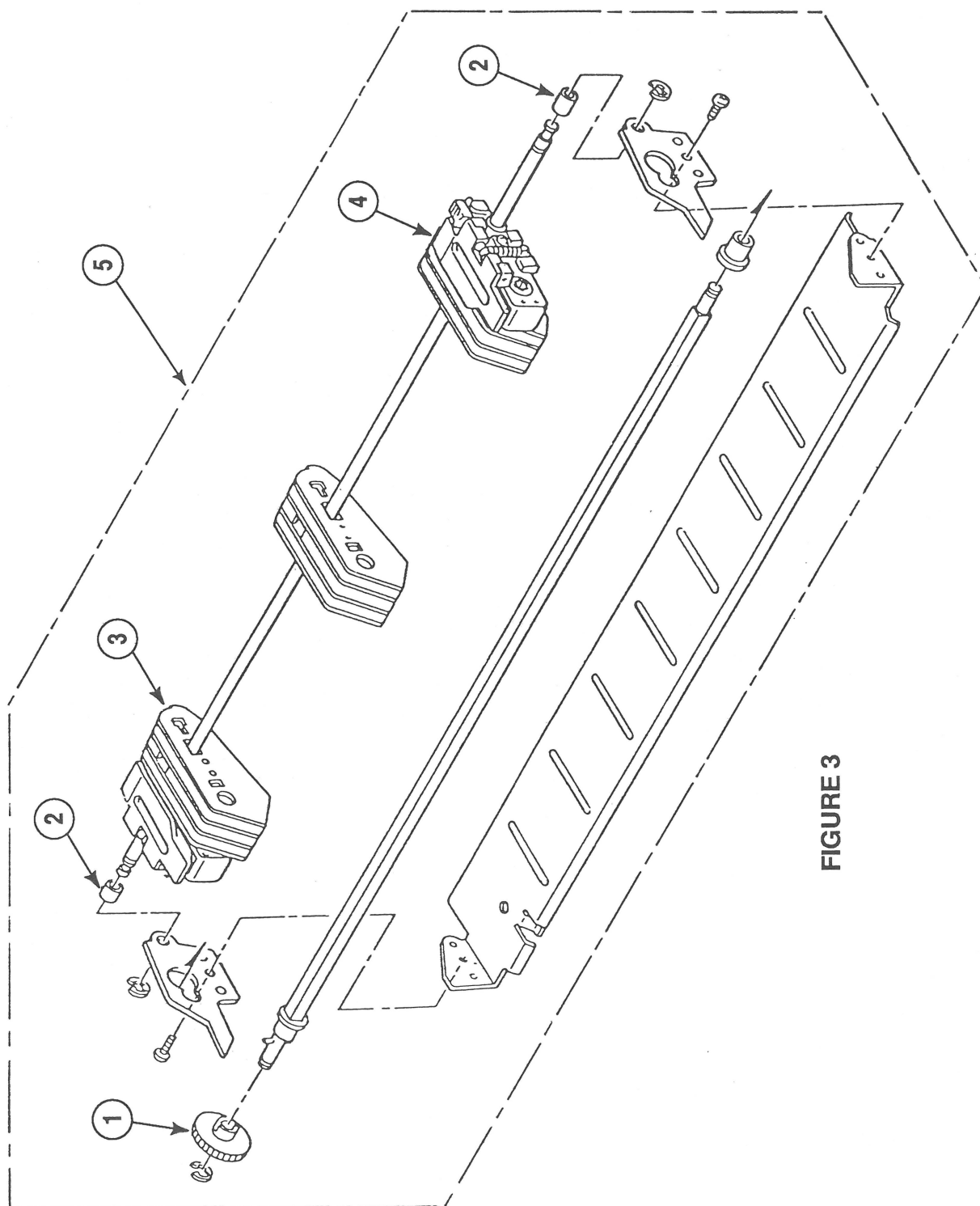
## □ TOP COVER ASSEMBLY (Figure 2)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	949-0140	Main Cover
2	590-0602	AppleTalk Connector Cable
3	076-0262	Access Cover Screw, Double Sems, 4 x 8mm (10/pk)*
4	952-0012	Case Top Magnet (10/pk)**
5	949-0138	Top Cover
6	949-0137	Front Cover
7	076-0262	Friction Release Lever (in Misc. Hardware Kit)
8	956-0016	Platen Knob w/o Ribs***
9	590-0601	Control Panel Cable
10	949-0141	Control Panel PCA

\*Also included in the Miscellaneous Hardware Kit  
(4 in kit).

\*\*Also included in item 6 and in the Miscellaneous  
Hardware Kit (2 in kit).

\*\*\*Also included in item 1 and in the Miscellaneous  
Hardware Kit and in the Rework Kit.



---

## □ TRACTOR FEED ASSEMBLY (Figure 3)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	939-0015	Tractor Drive Gear
2	076-0262	Spacer, Tractor Idler Shaft (in Misc. Hardware Kit)
3	076-0257	Left Tractor Assembly
4	076-0256	Right Tractor Assembly
5	948-0045	Complete Tractor Assembly (includes all above parts)

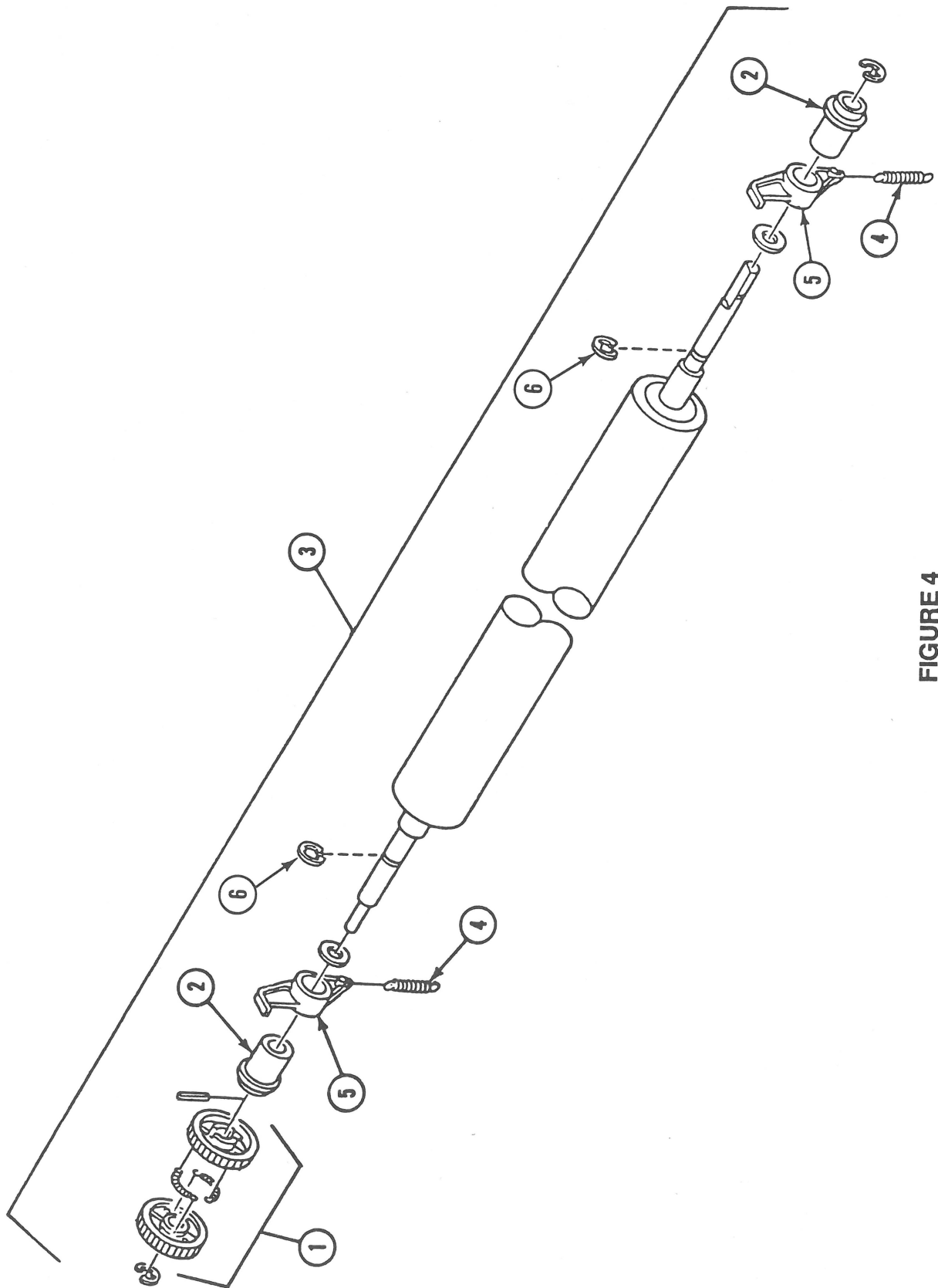


FIGURE 4

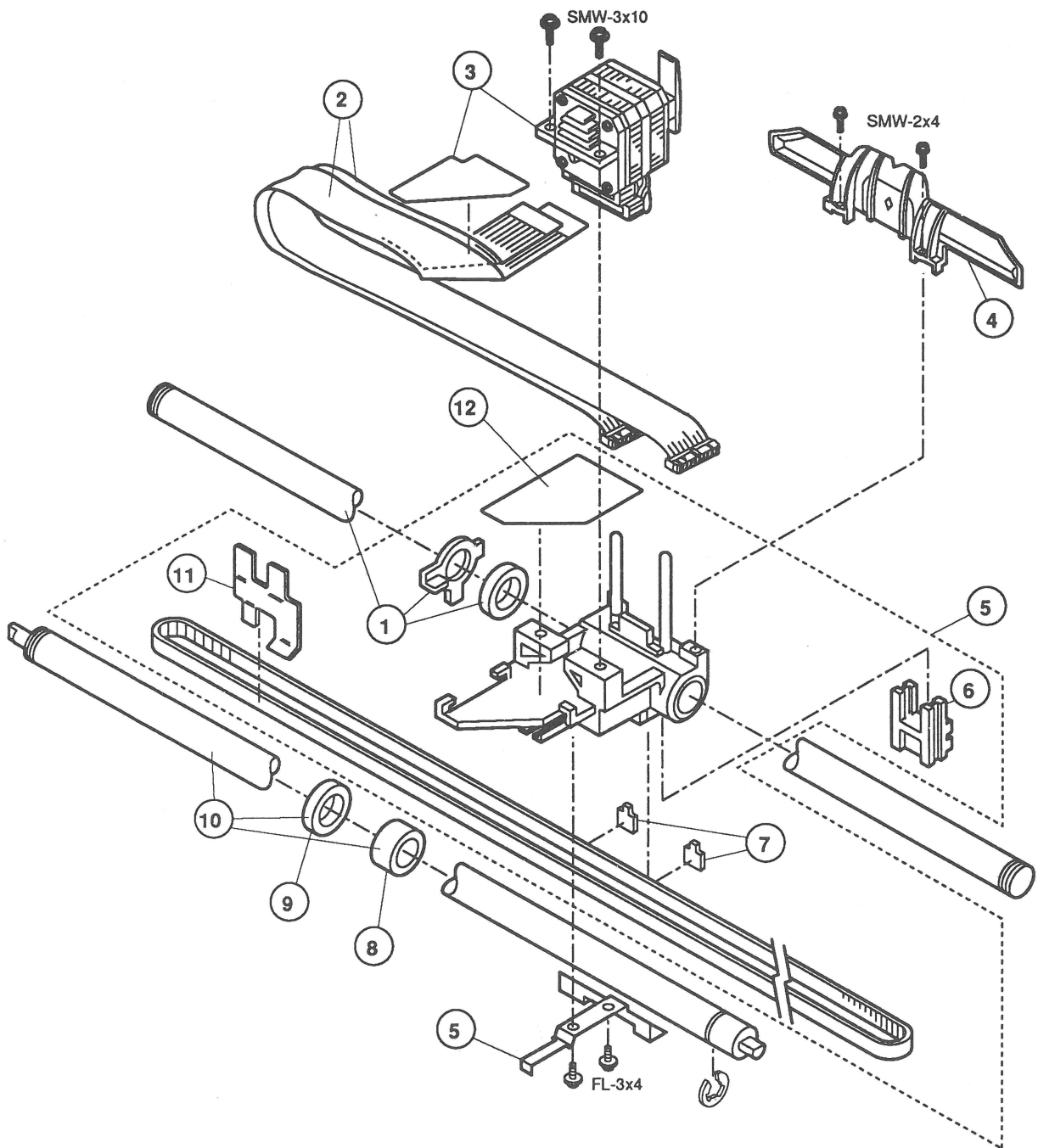
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## □ PLATEN ASSEMBLY (Figure 4)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	939-0018	Platen Drive Gear (3/pk)
2	959-0025	Platen Sleeve Bearing (6/pk)
3	076-0255	Complete Platen Assembly
4	957-0035	Spring, Feed Roller Cam (6/pk)
5	949-0169	Lever, Feed Roller Cam (6/pk)
6	958-0016	E-Ring, E-6 (2/pk)*

\*Included in Rework Kit





**FIGURE 5**

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## □ PRINT HEAD/CARRIAGE ASSEMBLY (Figure 5)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	076-0308	Rear Carrier Assembly
2	590-0603	Cables, Print Head to Relay PCB
3	661-0405	ImageWriter LQ Print Head
4	949-0217	Card Guide
5	076-0306	Timing Belt and Carrier Assembly
6	949-0170	Ribbon Support Guide (3/pk)
7	076-0262	Timing Belt Retainer (2/pk)
8	959-0026	Carrier Frame Bearing (3/pk)
9	959-0020	Carrier Felt Set (6/pk)
10	076-0307	Front Carrier Assembly
11	937-0030	Home Position Switch
12	949-0242	Sound-Damping Material*

\*Included in Rework Kit. Also sold separately.

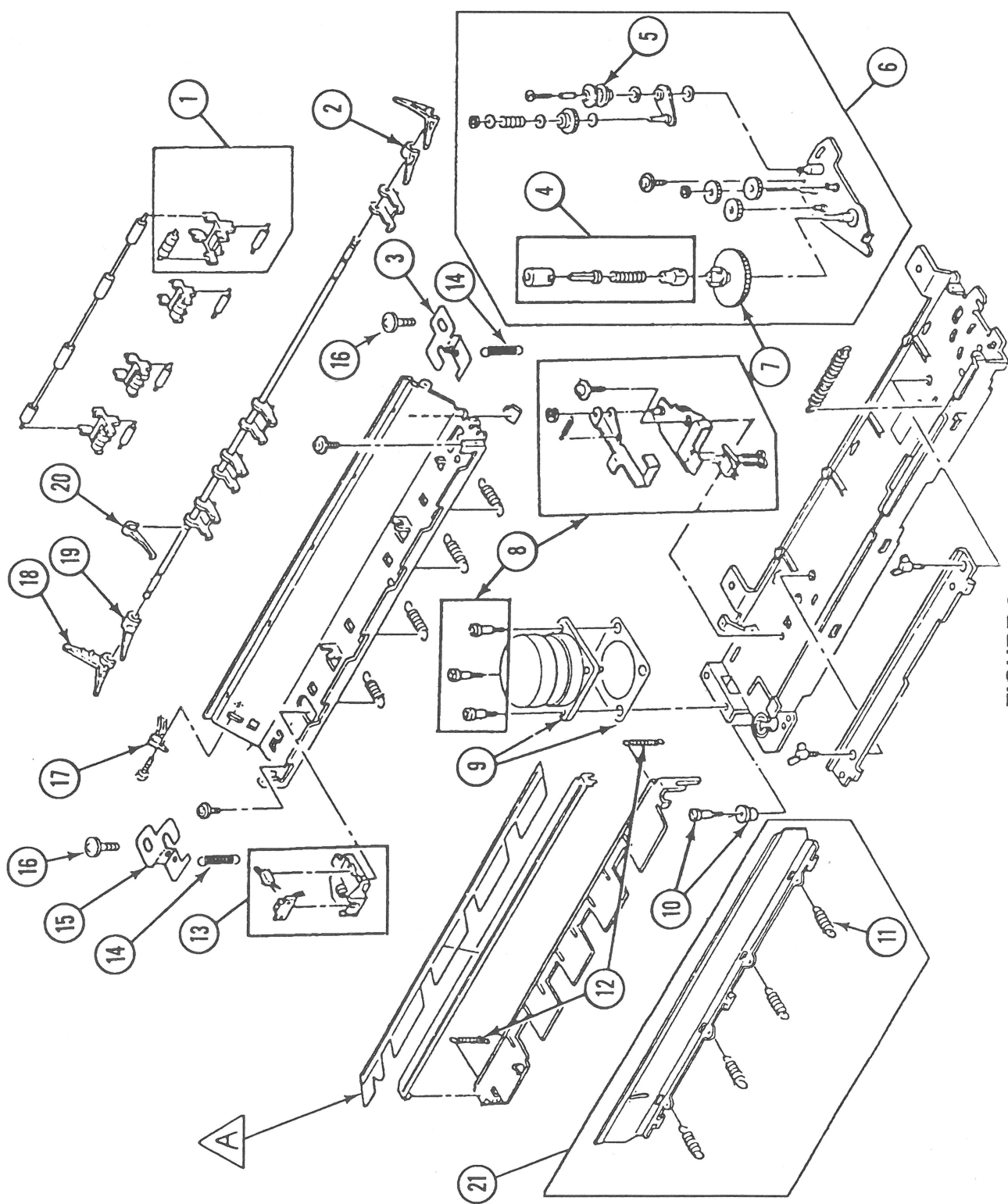


FIGURE 6

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## □ MAIN FRAME ASSEMBLY (Figure 6)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	949-0172	Lever, Paper Bail Adjustment, Right (3/pk)
2	949-0171	Paper Bail Lever (6/pk)
3	076-0346	Deflector Stop Plate, Right*
4	959-0027	Pin Assembly, Ribbon Box Drive (5/pk)
5	959-0024	Carrier Belt Pulley (3/pk)
6	939-0016	Ribbon Drive Gear
7	939-0019	Ribbon Drive Idler Gear (3/pk)
8	937-0030	Home Position Switch Kit
9	959-0016	Carrier Drive Motor
10	076-0262	Shoulder Screw, 4 x 15 mm, and Rubber Grommet (in Misc. Hardware Kit)
11	076-0344	Paper Deflector Spring (4/pk)*
12	957-0055	Paper Pan Spring (2/pk)*
13	948-0032	Paper-Out Sensor
14	957-0054	Platen Cradle Spring (2/pk)*
15	076-0345	Deflector Stop Plate, Left*
16	931-0026	Set Screw (2/pk)*
17	937-0033	Paper Detect Switch
18	949-0174	Lever, Paper Bail Adjustment, Left (3/pk)
19	076-0261	Pinch Roller Assembly
20	949-0173	Lever, Paper-Out Detect (3/pk)
21	076-8375	Paper Deflector with Springs

\*Included in Rework Kit. Items are also available separately.

**Note:** This item is available as part of the Rework Kit or the Paper Pan Subassembly.

A Platen Cradle Mylar

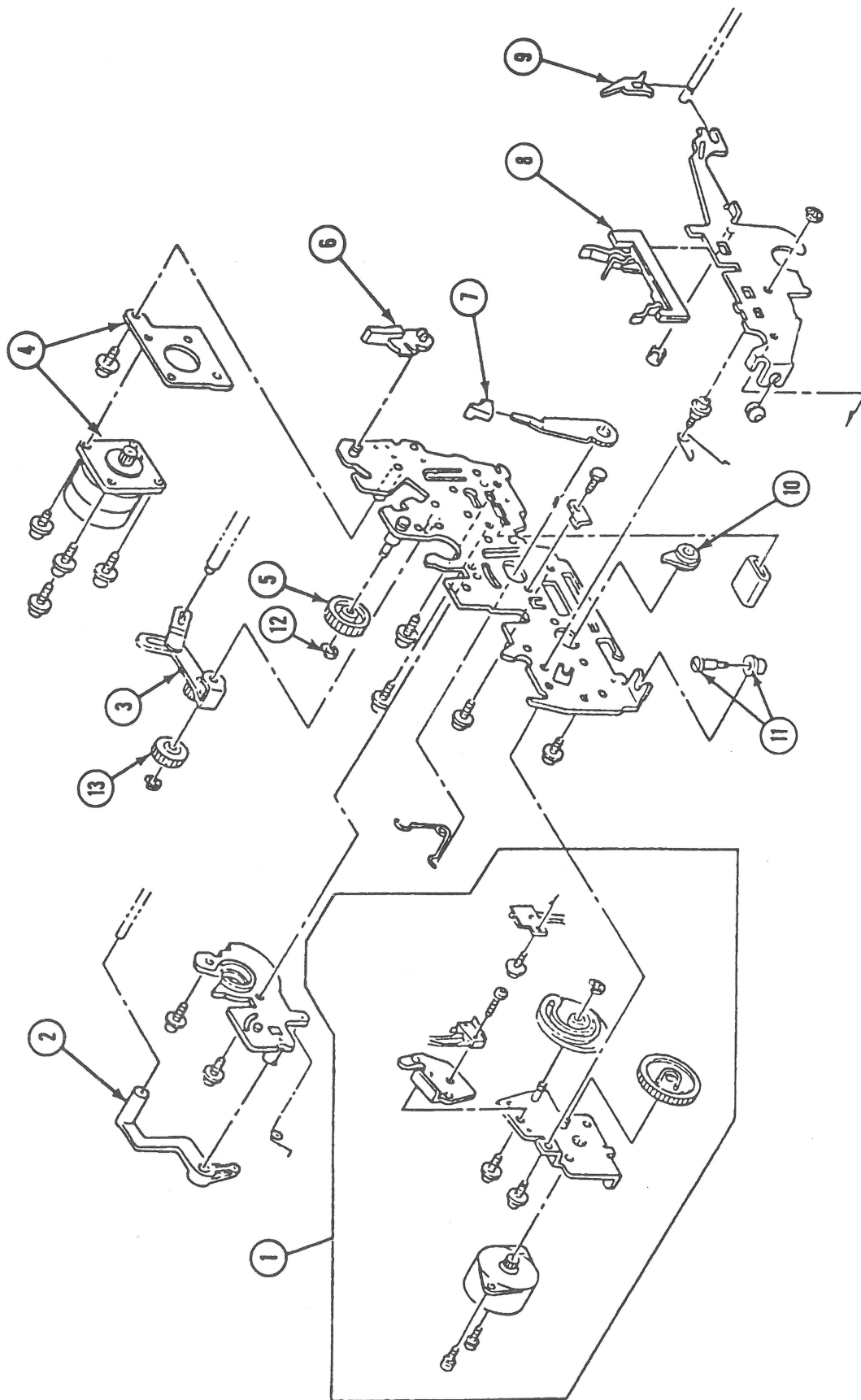


FIGURE 7

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## □ LEFT SIDE FRAME ASSEMBLY (Figure 7)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	959-0018	Motor Assembly, Color Ribbon
2	949-0175	Lever, Paper Bail Arm, Left (3/pk)
3	076-0258	Gear Linkage Assembly
4	959-0017	Paper Feed Motor
5	939-0038	Cut Sheet Feeder Drive Gear (3/pk)
6	076-0262	Lock, Tractor Lever, Left (in Misc. Hardware Kit)
7	076-0242	Gap Lever Cap (in Misc. Hardware Kit)
8	956-0008	Cassette Latch Set
9	949-0176	Lever, Ribbon Lift Shaft (6/pk)
10	959-0028	Bearing, Carrier Shaft, Right (3/pk)
11	076-0262	Shoulder Screw, 4 x 15 mm, and Rubber Grommet (in Misc. Hardware Kit)
12	958-0015	E-Ring, E-4 (2/pk)*
13	939-0020	Idler Gear (3/pk)

\*Included in Rework Kit



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## □ RIGHT SIDE FRAME ASSEMBLY (Figure 8)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	984-0003	Paper Bail Roller (6/pk)
2	949-0180	Bracket, Paper Bail/Platen (3/pk)
3	937-0034	Switch, Cut Sheet Feeder
4	949-0179	Lever, Paper Bail Arm, Right (3/pk)
5	935-0006	Auto Load Solenoid Assembly
6	949-0178	Link, Paper Bail/Solenoid (3/pk)
7	937-0035	Paper Bail Solenoid
8	939-0022	Gear, Ribbon Lift Cam (3/pk)
9	939-0021	Gear, Ribbon Lift Shift (3/pk)
10	959-0030	Cam Gear Collar (6/pk)
11	956-0008	Cassette Latch Set
12	959-0029	Bearing, Carrier Shaft, Right (3/pk)
13	949-0177	Lever, Cut Sheet Feeder Detect (3/pk)
14	076-0262	Lever, Tractor Lock, Right (in Misc. Hardware Kit)
15	949-0176	Lever, Ribbon Lift Shaft (6/pk)



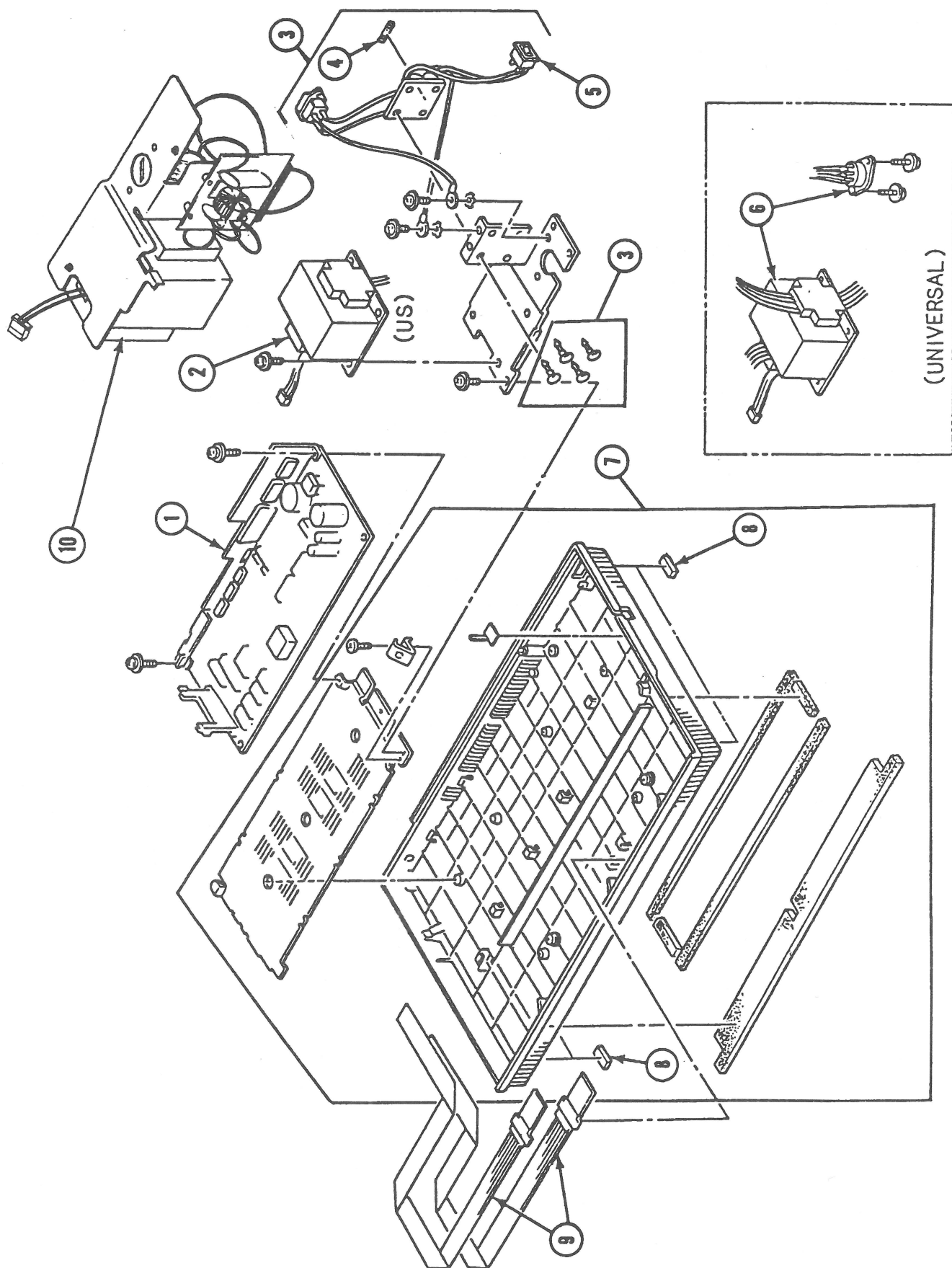


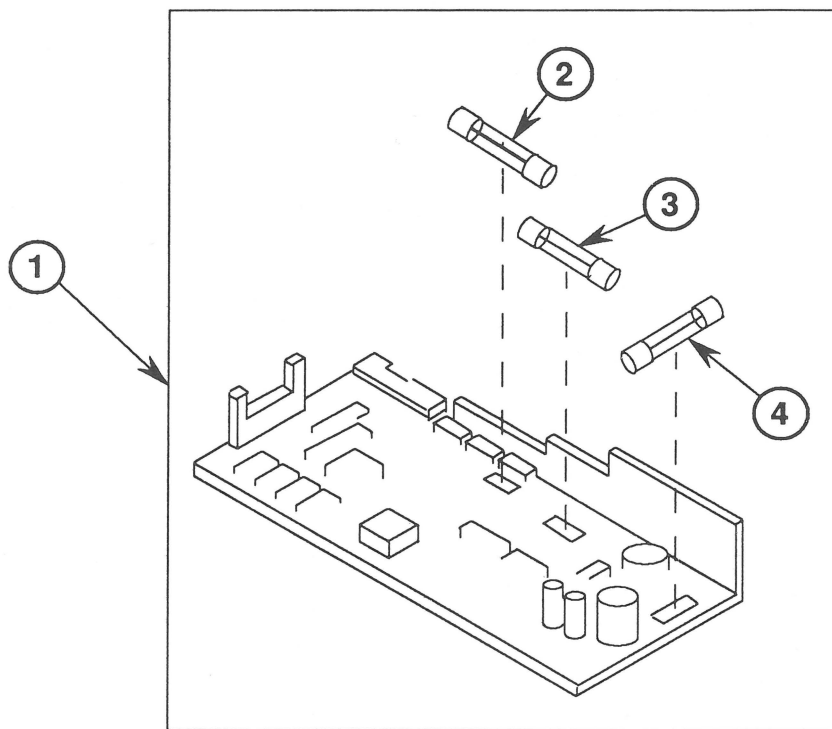
FIGURE 9

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## □ POWER SUPPLY AND MAIN PCB ASSEMBLY (Figure 9)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	661-0563	Main Board with Revised ROM
2	915-0030	Transformer 110 V
3	961-0006	Noise Filter Assembly, 100/240 V
4	941-0010	Fuse, 3 AMP
5	937-0032	Power Switch
6	915-0031	Transformer/Voltage Select Switch, 100/240 V
7	949-0139	Bottom Cover
8	076-0262	Rubber Foot (10/pk)*
9	590-0396	Flexible Relay Cables
10	915-0042	Transformer/Volt Switch Assembly, 100/240V (conversion)

\*Included in the Miscellaneous Hardware Kit (2 in kit).



**FIGURE 10**

---

## □ MAIN BOARD FUSES (Figure 10)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	661-0563	Main Board with Revised ROM
2	941-0012	Fuse, 1.5 Amp (Located on board at FU3)
3	941-0010	Fuse, 3 Amp (Located on board at FU2)
4	941-0014	Fuse, 8 Amp (Located on board at FU1)

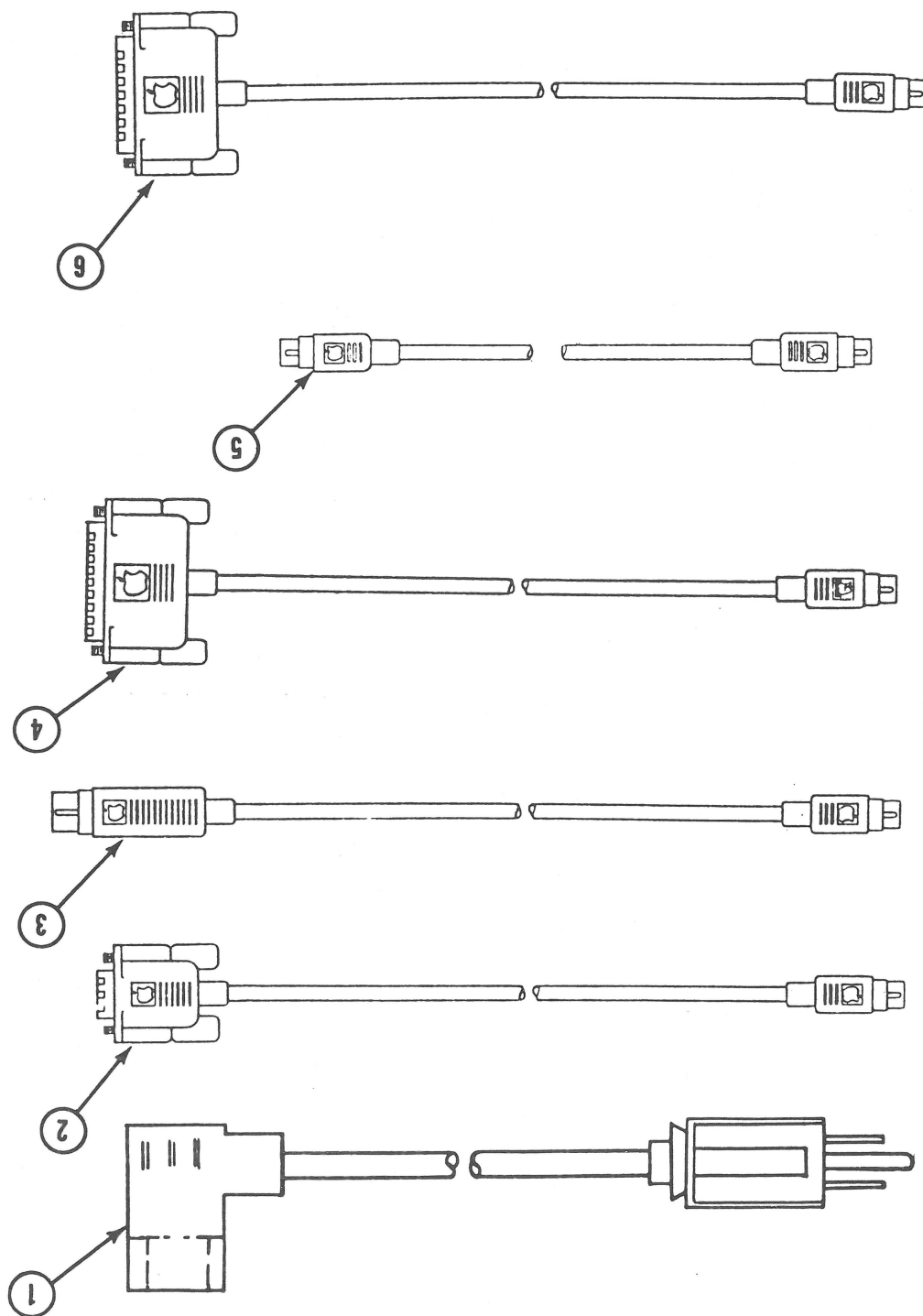
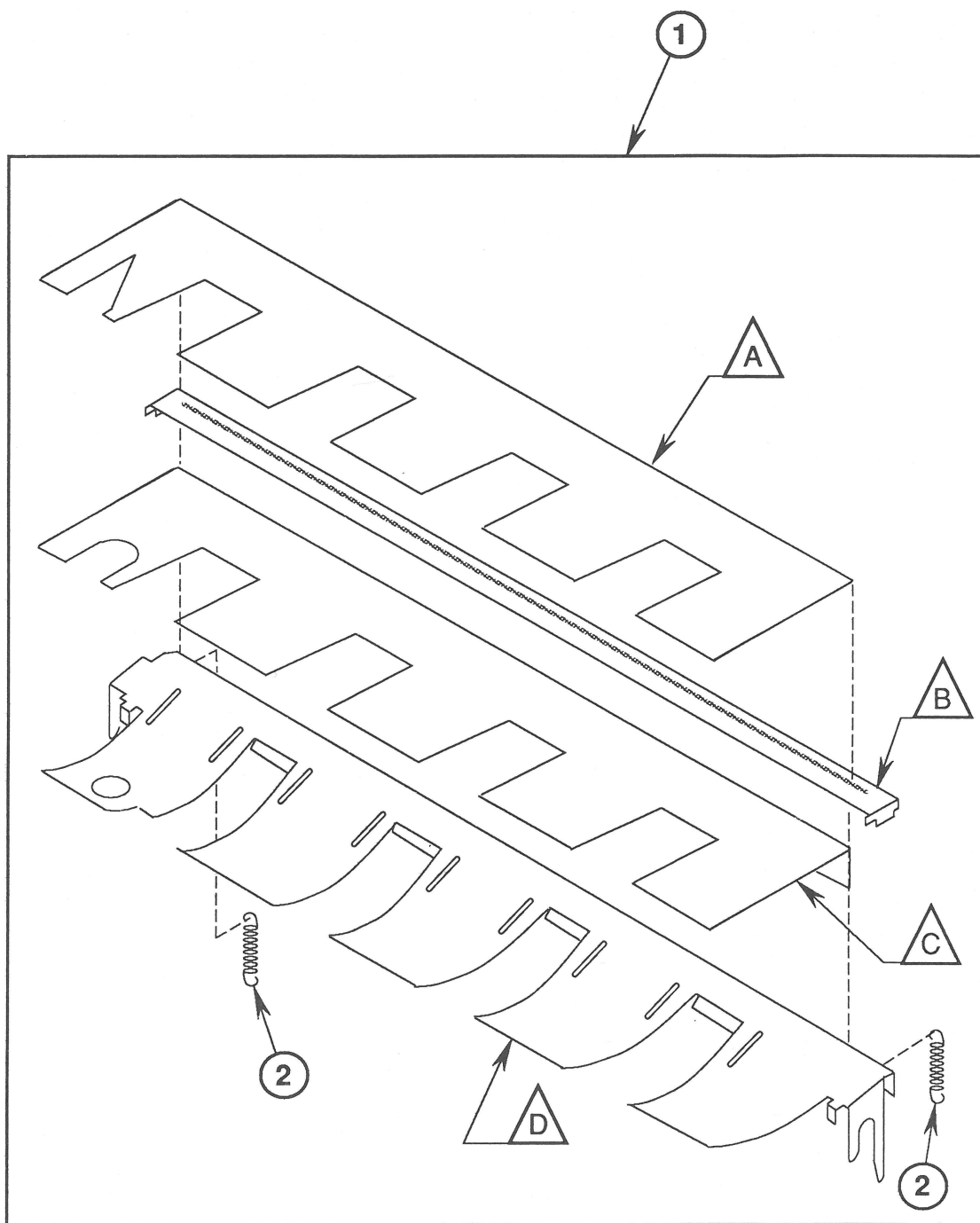


FIGURE 11

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## □ CABLES (Figure 11)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	590-0380	Cable, AC Power (Smoke)
2	590-0551	Cable, APM/ImageWriter II/LQ to Macintosh (Smoke)
3	590-0554	Cable, APM/ImageWriter II/LQ to Apple IIc (Smoke)
4	590-0556	Cable, ImageWriter II/LQ to Apple II, II Plus, IIe (Smoke)
5	590-0552	Cable, APM/ImageWriter II/LQ to Apple IIGS, Macintosh Plus/SE/II (Smoke)
6	590-0555	Cable, APM/ImageWriter II/LQ to Apple II/II Plus, Apple III/III Plus, Macintosh XL (Smoke)



**FIGURE 12**

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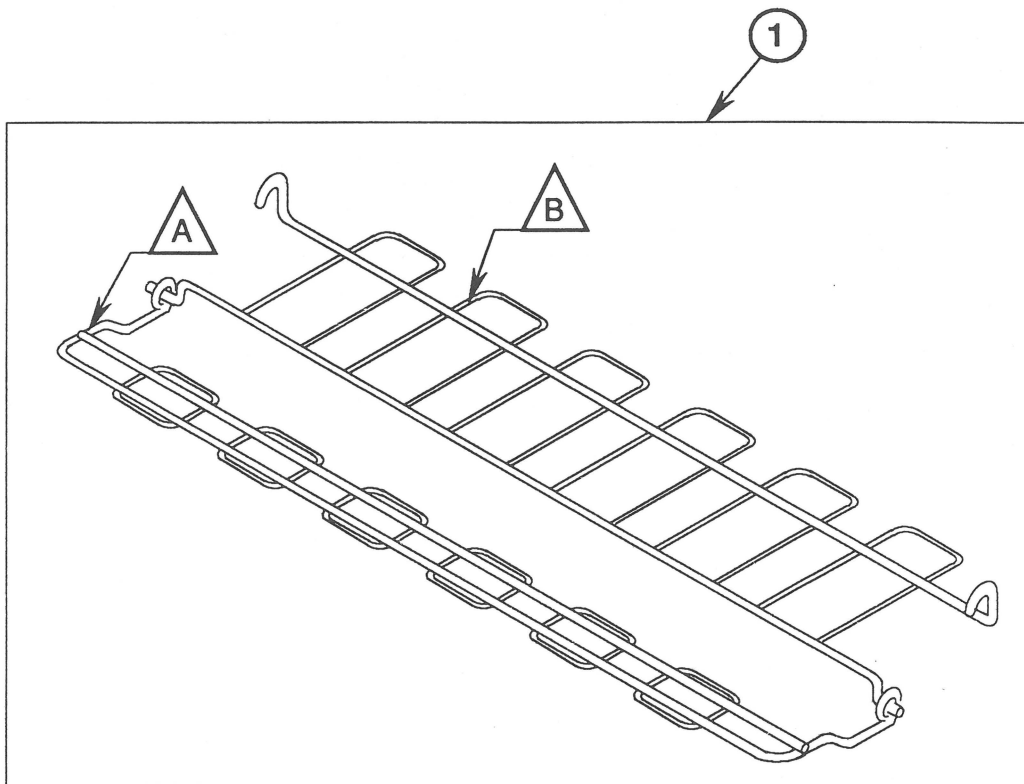
## □ PAPER PAN SUBASSEMBLY (Figure 12)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	948-0042	Paper Pan Subassembly
2	957-0055	Paper Pan Spring (2/pk)

**Note:** The following items are available as part of the Paper Pan Subassembly and are not available separately. The Paper Pan Subassembly is available separately or as part of the Rework Kit.

- A Mylar, Platen Cradle
- B Paper Table
- C Mylar, Paper Pan
- D Paper Pan (A)





**FIGURE 13**

---

## □ WIRE FORM ASSEMBLY (Figure 13)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	948-0043	Wire Form Assembly

**Note:** Some of the other parts shown in this diagram are available as part of the Wire Form Assembly in the Rework Kit. Refer to the Rework Kit for further information. These parts are not available separately.

- A Wire Form
- B Paper Separator



**FIGURE 14**

---

## □ TOOL (Figure 14)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	076-0347	Tool, Spring Remover/Install*

\*Included in the Rework Kit. Also sold separately.

# ImageWriter LQ

## SheetFeeder Illustrated Parts List

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### □ CONTENTS

- SF-IPL.3 Cut SheetFeeder (Figure 1)
- SF-IPL.3 Forward Collator Assembly (Figure 2)
- SF-IPL.5 Single Bin (Figure 3)
- SF-IPL.5 Extension (Figure 4)
- SF-IPL.7 Envelope Hopper (Figure 5)

The figures and lists above include all piece parts that can be purchased separately from Apple for the ImageWriter LQ, along with their part numbers. These are the only parts available from Apple. Refer to your *Apple Service Programs* manual for prices.

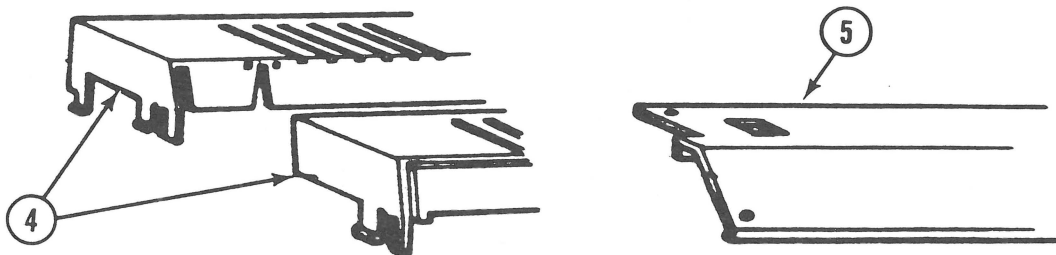
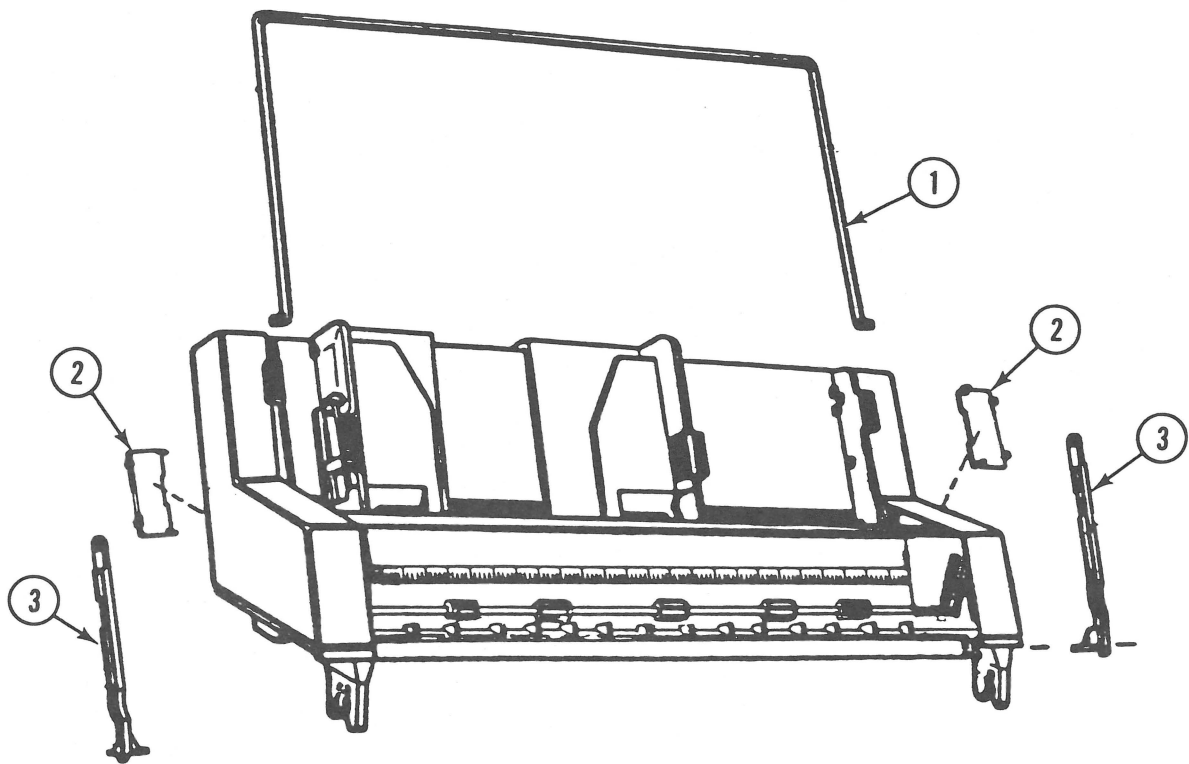


FIGURE 1

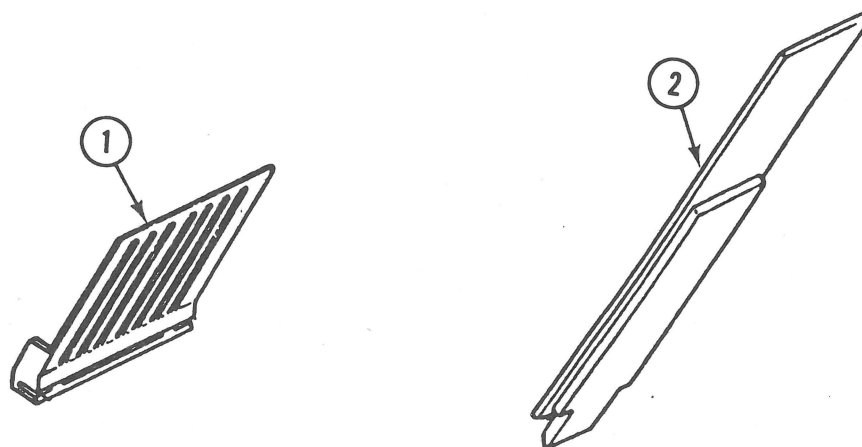


FIGURE 2

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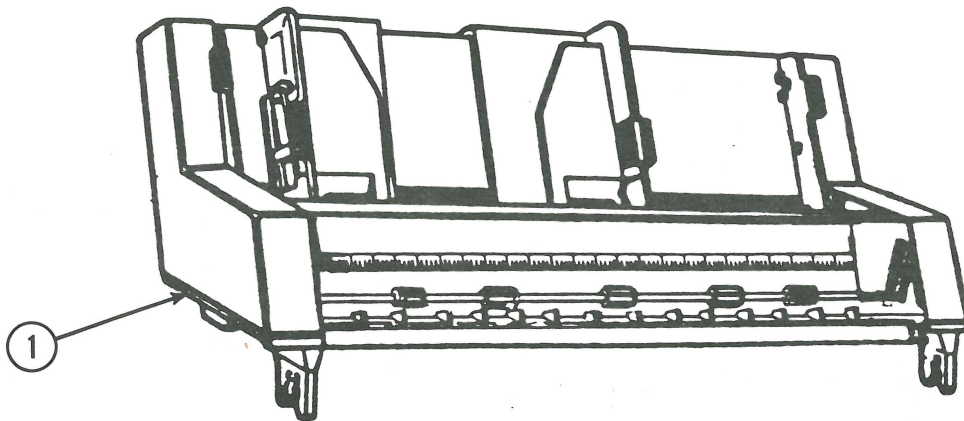
## ❑ CUT SHEETFEEDER (Figure 1)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	949-0188	Paper Holder
2	949-0189	Rear Cover
3	949-0191	Separation Finger Kit
4	949-0190	Rear Panel Kit
5	948-0033	Paper Guide Plate

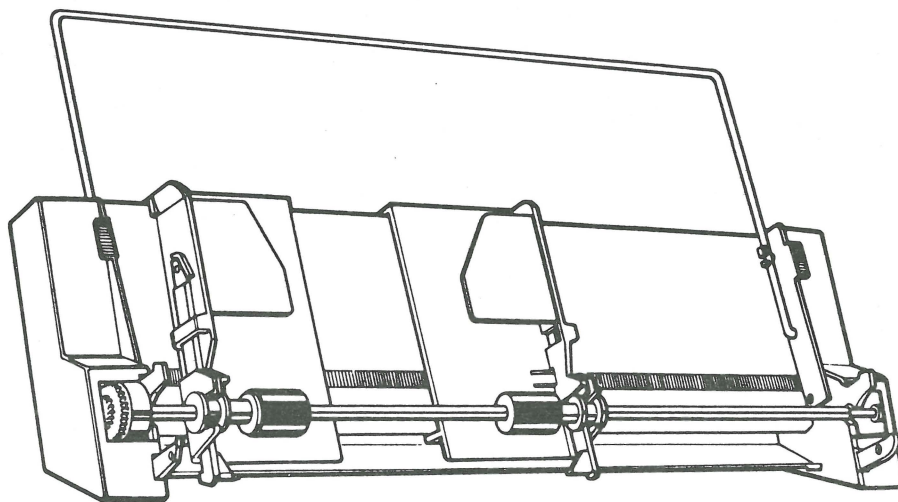
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## ❑ FORWARD COLLATOR ASSEMBLY (Figure 2)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
—	949-0194	Forward Collator Assembly
1	949-0192	Forward Collator Paper Deflector
2	949-0193	Forward Collator Support Output



**FIGURE 3**



**FIGURE 4**



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**□ SINGLE BIN (Figure 3)**

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
–	661-0446	Single Bin
1	956-0014	Rubber Feet (4/pk)

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**□ EXTENSION (Figure 4)**

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
–	661-0447	Extension

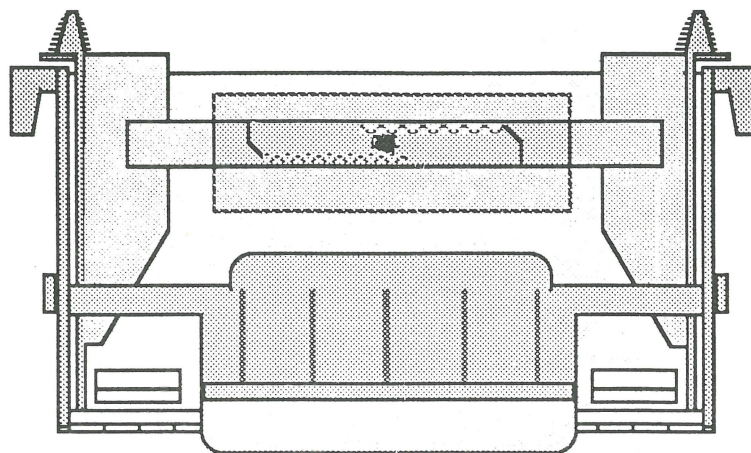


FIGURE 5

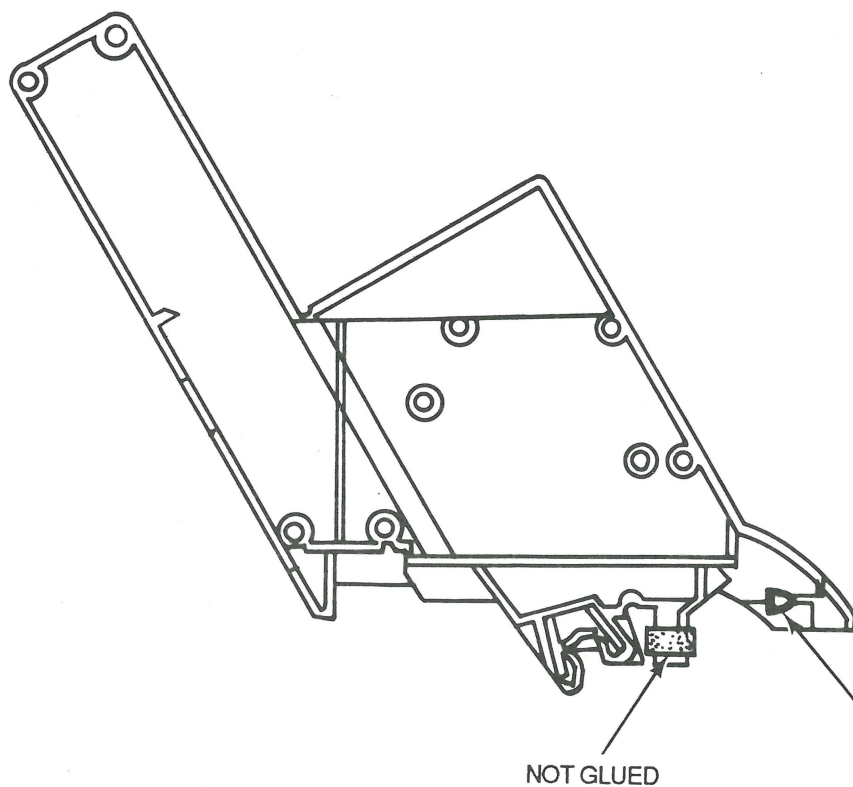


FIGURE 6

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**□ ENVELOPE HOPPER (Figure 5)**

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
–	949-0195	Envelope Hopper

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**□ SINGLE BIN – SIDE VIEW (Figure 6)**

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	956-0013	Rubber Stoppers